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# USSR Report

SCIENCE AND TECHNOLOGY POLICY

No. 7

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# USSR REPORT

## SCIENCE AND TECHNOLOGY POLICY

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## IMPORTANCE OF SCIENTIFIC, TECHNICAL PROGRESS STRESSED

Moscow TRUD in Russian 16 Sep 82 p 2

[Article by Academician G. Marchuk, deputy chairman of the USSR Council of Ministers, chairman of the USSR State Committee for Science and Technology: "Science, Always a Search"]

[Text] Now when the 60th anniversary of the formation of the USSR is being celebrated, we evaluate the path which has been traversed. One can say confidently that the Soviet people are energetically implementing the plans for the near future, the plans for economic and social development of the USSR for the period up to 1990.

These plans are the specific realization of the program developed by the 26th CPSU Congress. Its main feature is completion of the transition of the national economy to the intensive path of development. This course was completely reflected in the tasks for the 11th Five-Year Plan. The speech of Leonid Il'ich Brezhnev at the November (1981) and May (1982) CPSU Central Committee Plenums indicated well how important it is for our country.

It is common knowledge that in the previous years, primary attention in the country was focused on increasing production and economic potential. Capital investments mainly went for construction of new enterprises, for expansion of the material base. As a result, in the last two five-year plans, the national economy achieved a noticeable success, the main industrial funds were practically doubled. Now we have to obtain from them a good output. How can this be done? Of course, by increasing labor productivity: by improving equipment, conserving raw materials, materials, energy and workers.

The scales of development of our economy are now such that introduction into practice of the latest achievements of science and technology does not always keep in step with the requirements of the day. It is no accident that a new approach was needed for controlling the cycle "science-technology-production." There was a time, and it was not so long ago, when developments of a multi-sector nature were held back fairly often by departmental boundaries. The sectors of the national economy mainly solved their own current problems and implemented their own scientific-technical programs. The large intersector problems, although they were considered mandatory for fulfillment, were almost not reinforced by material resources.

In order for the cycle "science-technology-production" not to be broken, the 26th Party Congress set the task of uniting by organization and economy the activity of the scientific research, planning-design institutions and industrial enterprises. In fulfilling it, the USSR State Committee for Science and Technology together with the Academy of Sciences, Gosplan, Ministry of Higher and Secondary Specialized Education, and the USSR Gosstroy formed 170 state programs of scientific-technical progress. They presuppose the solution of such intersector tasks as, for example, protection of metal from corrosion, creation of new wear-resistant materials, basically of smelting and welding, and so forth. After solving these problems, we will give invaluable support to the fuel and energy complex and machine construction, chemistry and production of technically complicated consumer goods. I would like to make special note of the fact that 20 programs have been designed for improving the technical level of agriculture.

In a word, the role of scientific and technical progress in the further development of our country is drastically increasing. The successful solution to the task of accelerating it depends a lot on the condition of the material and technical base and the level of organization of scientific studies. It is known what a negative effect the weak experimental base has on the efficiency of some scientific-research institutes. It is no secret that the shortcomings in the leadership of the scientific collectives on the part of the ministries and departments does great damage to the work of introduction. A consequence of these factors is the unjustified delay of introduction of valuable innovations, at times for years. This had an especially negative effect on the creation of technology: its role in many sectors was belittled. What is technology? This is social technical science. It still has a fundamental impression, but has already become applied and has been placed in the equipment of today.

In our time, with the national economy is passing to intensive path of development, the value of technology rises immeasurably: reconstruction, technical re-arming of enterprises generally are done on the basis of modern equipment.

The USSR State Committee for Science and Technology, jointly with the ministries and departments is therefore focusing attention today on organization of a network of technological centers. It is planned to create them in all sectors. In a number of places, it is true that they are already existing, but we are concerned with those powerful centers which would influence the development and introduction of modern technologies.

As an example I will dwell on the experience of the Ministry of Electrical Engineering Industry. In this sector, a structure of institutes and organizations has been created from threelinks , for all basic directions of its development.

The first level is formed by four scientific-technical centers who fulfill the work of general sector importance (theoretical and basic research, scientific and experimental-design developments). The second level is made up of scientific-technical centers where scientific-design and technological developments are made in subsectors secured for them. These centers are completely responsible to the ministry for the technical level of the manufactured product, for improvement in technology and improvement in the technical-economic indicators of operation of the enterprises.

The third level is specialized institutes and design-technological organizations who are mainly subordinate to the production associations and enterprises.

This structure, as well as the currently widely used system of certification of the technological processes made it possible to reduce 1.5-2-fold the periods for creating new items, and almost half of the products of the entire sector are manufactured on the highest category of quality.

Nevertheless, the basis of the bases in this work is of course the people. Personal contribution to it of each worker of science, each colleague of the planning and design organizations, technologist and engineers. Today as never before, it is necessary to have creative activity and initiative of all involved in the sphere of science and scientific service. Consequently the role of socialist competition is inestimable.

In science, from year to year, it adopts a broader scale. The time has passed of doubt regarding the effectiveness of socialist competition namely in the scientific collectives. Today it has acquired here the most diverse form: collective and personal commitments, inspections, competitions, joint commitments of laboratories or even several institutes working on one problem, with production collections and sector scientific research institutes.

Now the main criterion for evaluating the work of the scientific collectives is primarily participation in the creation and introduction into production of machines, equipment, progressive technology based on the fulfilled basic and applied studies.

The transition of a scientific discovery to the sphere of material production has become the most important link in the system "science-production." Here the USSR Academy of Sciences and the academy of sciences of the republics plays a leading role.

In the last five years, for example, Ukrainian SSR Academy of Sciences has developed over 300 technologies of different level. Some of them resulted in significant, truly revolutionary transformations in industry, in metallurgy and machine construction. A number of first-class developments were realized by the national economy by the Institute of Atomic Energy imeni I. V. Kurchatov, primarily powerful reactors for nuclear power plants. Who does not know the weighty contribution to sea shipments of the entire family of nuclear ice breakers!

An example of the high intensity of the scientific search and introduction of its results can be the work of the Leningrad scientists. They have created the world's first cryogenic turbogenerator, by using the phenomena of superconductance. The efficiency of this turbogenerator reaches 99.5 percent, a quantity which is unprecedented in world practice until now.

The scientists of Belorussia have achieved great advances in solving major technical problems, after creating the scientific-production associations which made it possible to significantly accelerate the process of introducing scientific results into practice. We are primarily concerned with the scientific production association of powder metallurgy, as a result of which the enterprises even now are manufacturing about 100 tons of items per year. The association produces powder and composite materials for 12 ministries.

In order to significantly accelerate the process of introducing scientific results into industry, the Siberian department of the USSR Academy of Sciences, around the academic cities, is actively developing applied science. The sector scientific research institutes and design offices are effectively linking basic science with production. As a result, the economic effect from introduction in the 10th Five-Year Plan alone was R 250 million.

Of course, socialist competition in the scientific-technical sphere has a number of features. They are associated with the specific nature of labor of the researchers, designers, and planners. It is not easy to evaluate the work of the scientists, especially one involved in basic research. Any major scientific research is a lengthy process which requires thinking out the results, and their comprehensive discussion. Only within several years after issuing of the publication, obtaining of the certificate of authorship or patents, after recognition of the results by the scientific community can one imagine how major a contribution a certain work makes, and what is its place among the national and world achievements.

Nevertheless, the experience of organizing socialist competition in scientific institutions involved in basic research is already present. One cannot help but note the serious creative activity of the party and trade union organizations of the Institute of Chemical Physics of the USSR Academy of Sciences. The necessary method materials have been developed here, criteria have been evaluated for defining the results obtained by the scientific colleagues.

However, in this direction there remains a lot to be done, primarily by the trade unions. If the forms and methods of creative cooperation within the laboratory, and department in the framework of one institute are more or less clear, between the related laboratories of different institutes and between the institutes of one sector they are still only outlined. Of course it is not easy to commensurate the work of the scientific collectives, one of which is involved with basic developments, while the other is solving applied problems. But practice indicates that in this case one can find the criteria: our main task is to improve the efficiency of operation of the scientific institutions.

Realization of the task of scientific-technical progress to a definite degree depends today on the responsibility of people for the work entrusted. Whereas comparatively little depended on yesterday's worker, today's operator on the chemical units, the duty electrician or the mechanic in the shops of continuous production determine the continuous operation of many links and dozens of sub-contractors. If man is inattentive on some sections, the losses have to be compensated for many times. There is yet another characteristic sign of the times: people are being more involved in controlling powerful, complicated and expensive equipment. According to the calculations of the economists, the average worker in the agricultural sector in 1990-2000 will have resources of production costing R 25,000-30,000. Under these conditions the factors of effectiveness of production which directly depend on the level of skill, degree of organization and degree of discipline, degree of interest in result of work, ability and desire to work become decisive. Therefore the balance between the creative capacities, responsibility of the modern workers and those potentialities which production gives them are so important. Only in the case of their agreement and harmony will scientific-technical progress yield the maximum results.



The future decade must mark a new stage in combining the achievements of scientific-technical revolution with the advantage of socialism. It remains to significantly more completely and effectively use the enormous production and scientific-technical potential created by the selfless labor of the Soviet people. The task has been set of guaranteeing further progress of the mature socialist society. "Today, looking ahead five, ten years," it was stressed in the Accountability Report to the 26th Party Congress, "We cannot forget that precisely in these years the national economic structure will be formed and created which the country will enter the 21st century with."

The most important element of this national economic structure is the accelerated development of science and technical progress.

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## METHODS OF INTEGRATING SCIENCE AND PRODUCTION DISCUSSED

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 8, Aug 82 pp 48-51

[Article by A. Cheblakov, candidate of economic sciences: "Assistance in the Matter"]

[Text] Our country possesses great scientific and technical potential. More than 4 million people, for example, are employed in science and science services; among them more than 1.4 million people are scientific workers which comprises one fourth of their total number in the world. Billions of rubles were allocated for the development of science in 1982 alone--5.2 percent greater than in 1981. The rates are greater here than the rates for the national income. Naturally we have a right to expect a high return from science.

During the current five-year plan the development of science and technology must, as stipulated by the 26th CPSU Congress, to an even greater degree be subject to solving economic and social problems, accelerating the transition of the economy to the path of intensive development and to improving public production efficiency. It is stipulated, in particular, that advanced technological processes be adopted in the national economy, principally new machines and equipment and economic, structural and other materials that ensure the highest level of quality in a product. "We cannot and we should not settle for anything less than that which corresponds to the best world and native models," emphasized comrade L. I. Brezhnev in his speech to the 26th CPSU Congress. "In addition we must train ourselves and we must achieve this decisively while discarding everything that is outmoded, lagging and marked down by life itself."

At the present time much attention is being given to rearming all of the sectors of the national economy with highly productive technology and means of automation. Thousands of automated systems for controlling technological processes and computer complexes using microprocessors and mini-computers will be put into operation. Automated manipulators (industrial robots) are scheduled to be manufactured during the current five-year plan in quantities eight times greater than during the 10th Five-Year Plan. Units with a large individual capacity and advanced technological processes for working materials--electron beam, laser, electro erosion, plasma driven and others--will find extensive applications in many sectors.

In our time, when the role of science is becoming ever more apparent in direct production power, in the process of practical use itself and even in obtaining

scientific and technical knowledge, it should be socially organized, i.e., precisely managed (planned, controlled and regulated). It is no coincidence that the adoption of scientific discoveries and inventions was defined as the decisive, most critical sector of the entire system of public production at the 26th CPSU Congress.

The point being made is to build up precise interactions along the entire research and development chain--from the idea to practical implementation--for "if one analyzes all the links in the complicated chain that joins science and production it is not difficult to see," as was also noted at the 26th CPSU Congress, "that the weakest ones are the links associated with the practical implementation of the scientific achievements and with adopting them in mass production."

Good experience about the connections between science and production has been accumulated at Belorussian enterprises. Thus the Minsk automobile workers' collective in collaboration with the collectives of the Yaroslavl' "Avtodizel" Association, Motor Vehicle Combine No 1 in the Main Moscow Motor Vehicle Transportation Administration, the Central Scientific Research Institute for Motor Vehicles and Automobile Engines (NAMI) and the Moscow Highway Institute (MADI--later joined), while fulfilling the resolutions of the party concerning an improvement in the technological level, economical attributes and quality of all types of products concluded, for the first time in the country, an agreement on scientific and technical cooperation in May 1972. Later such agreements were concluded by all the leading motor vehicle associations in the country.

A council of directors of enterprises and organizations--participants in scientific and technical cooperation who regularly and strictly sum the results of the work of the collectives on an informal basis--was formed for controlling the pace of completing the mutual obligations. In addition, a permanent working group which included the leading specialists from the enterprises and organizations that took part in the agreements was formed for more operative solutions to current problems and also to develop and expand the clauses in an agreement.

Such an organization of cooperation has made it possible: first of all, to thoroughly solve the problems of improving the technical level of motor vehicle technology right at the design stage; secondly, to ensure that the very first industrial models were carefully tested under the actual conditions of use and on this basis the structural components were operatively refined even before the start of serial production of the motor vehicles; third, to ensure qualified systematic control over the motor vehicles' performance during the entire period that they are used.

All of this made it possible to increase the power of the MAZ [Minsk Motor Vehicle Plant] motor vehicles with YaMZ [Yaroslav Motor Vehicle Plant] diesel engines up to 300,000 kilometers without major repair work and at the same time to reduce the consumption of spare parts and labor for service and repair work by 20 percent which provided the national economy with millions of rubles in savings. The leading drivers at Motor Vehicle Combine No 1 in the Main Moscow Motor Vehicle Transportation Administration and motor vehicle enterprises in the BSSR Ministry of the Motor Vehicle Industry, with whom the "BelavtoMAZ" collective had also already concluded an agreement for scientific and technical cooperation in 1976, improved the mileage operation of the MAZ motor vehicle without major repair work to 350,000 to 400,000 kilometers with the same standard spare parts consumption.

The high quality and reliability of the motor vehicles from the Minsk motor vehicle plant are also confirmed by the fact that all MAZ motor vehicle models are certified as being in the highest category and are turned out with the State Seal of Quality.

There is yet another form of integrating science with production that deserves attention which originated at MAZ in 1974 and then was extensively used in Belorussia--the MAZ-BPI [expansion unknown] Scientific Training Production Association which operates on social principles. The structure for managing it has completely justified itself. The association is headed by a council which is comprised of administrators of "BelavtoMAZ's" services and departments, administrators and the leading scientists of the institute, party committee and comsomol committee secretaries and representatives of public organizations. Immediately after the association was formed working plans were developed and approved which at the present time are drawn up for the five-year plan and are defined specifically in the annual plans. These plans are successfully being brought to fruition.

The formation of specialized sections--structural, technology, metallurgy, power, economy, public-political and training-education--has affected the combined work in a positive manner. They are headed by the leading specialists of "BelavtoMAZ" and prominent scientists from the institute. All of this promotes an increase in cooperation between the enterprise's subdivisions and the institute's personnel.

A base department in the "Large Load Carrying Motor Vehicles" Institute was formed at the motor vehicle plant which was staffed with experienced specialists from the "BelavtoMAZ" Association, the majority of whom have scientific degrees and titles. The formation of the base department promotes an improvement in the apprentice work system and in organizing the practical production experience of the students, and an increase in the number of practical course and diploma designs that can be applied in practice at the association's enterprises. The amount of joint research has expanded and the possibilities of experimental testing and of adopting scientific developments has expanded. Where research was conducted in, say, 9 areas in 1974, during the 10th Five-Year Plan it was in 34 areas every year (it is 38 areas in the long-range plan for joint work for the 11th Five-Year Plan). The amount of work resulting from economic agreements increased during this period from 65,000 to 400,000 rubles while the economic effect increased from 140,000 to 845,000 rubles. For each ruble of expenditures on completed scientific work a savings of 2.52 rubles was obtained during the 10th Five-Year Plan versus 2.15 rubles in 1974. The relative proportion of expenditures for scientific research work through economic agreements with BPI of the total amount of work through economic agreements with other organizations increased from 10 percent in 1974 to one fifth at the present time.

The public forms of integrating science with production that were mentioned which were created and developed at MAZ are, on the one hand, based on the scientific research potential formed at the plant during the course of solving the problems of designing and manufacturing automobile technology on a level equal to the best models in the world and, on the other hand, promoted the development of the plant sector of science the level of which inevitably led to the necessity of integrating with large-scale academic science.



In the beginning the contacts between plant scientists and academic institutes had a strictly official nature and determined the individual yearly economic agreements. But life and the demands of practical application required closer ties. The problems that stood before the Minsk motor vehicle workers led to the formation of an Academic Department for Research into the Problems of Trucks (ORgA) in 1975 which was given the task of accelerating the creation of new technology based on the adoption in production of the results of research and developments by the BSSR AN [Academy of Sciences] institutes, in particular by the institutes dealing with the problems of the reliability and durability of machines, technical cybernetics, and mathematics.

ORgA played a positive role in establishing closer ties between the plant sector of science and academic institutes, increased confidence and respect for the research that was done by the plant at the latest possible time, prepared a base for forming the scientific production association "Technical and Physical Mathematics Type Institutes under the BSSR Academy of Sciences and Enterprises in the 'BelavtoMAZ' Production Association" (shortened to Avtofiztekhn) on social principles. This association, formed in May 1979, has an annual economic effect equal to 4 million rubles.

The cooperation between Belorussian motor vehicle workers and various types of scientists is a good example of a creative approach to integrating science and production and "deserves comprehensive development" as A. P. Aleksandrov, president of the USSR AN [Academy of Sciences] noted at the special seventh session of the ninth convocation of the USSR Supreme Soviet.

However, the public forms of integrating science with production cannot completely solve all of the problems that arise in this very complicated process. In particular due to the unequal wages and working conditions the plant sector of science is encountering a lack of qualified personnel. The public forms also do not provide the stability required at the junctions between science and production on which the timetables for adopting the achievements of science and technology in production directly depend. And the necessity of reducing these timetables is really one of the most important problems for the national economy.

The CPSU set a goal of huge importance: to place all of the sectors of the national economy at the most advanced frontiers of science and technology. As was noted at the 26th Congress this means that scientific research and structural design work should be more closely associated--economically and organizationally--with production.

Thus, the problem of adopting, and more accurately the problem of creating a reliable mechanism for the interaction of science and production deserves in-depth, comprehensive, complete research. It must be organized and begun as quickly as possible since each day gained turns into many rubles saved. And not only the areas that are now started in science by unused capital but also the areas (substantially larger) that could provide an increase in the use of practically meaningful scientific developments.

In this regard we should pause on the activities of the production (PO) and scientific production associations (NPO), which, as is stipulated, will become the

primary cost accounting links in industrial production. At the beginning of the current five-year plan the number of associations (here and below associations are understood to be both PO and NPO) in the country's industry totaled 4,100 in which more than half of the entire number of industrial production personnel are employed.

The experience of the leading Belorussian production associations ("BelavtoMAZ," MTZ [Minsk Tractor Plant] imeni V. I. Lenin, MPOVT [expansion unknown] and others) confirms that only the largest formation based on the strength of a substantial expansion of research and developments in the plant sector of science and the formation of efficient structural bureaus and a powerful experimental base at enterprises is it possible, if not to provide a source, then at least to limit the flight of first class specialists who are trained in touch with production.

The results from the plant sector of science are completely commensurable (especially in the plan of the economic effect) with what academic institutes put out and in many cases exceed the results of the activities of individual scientific research and technological design institutes and institutions. That is, the conclusion reached at the 26th CPSU Congress concerning the important effect that the formation of powerful scientific and technological production complexes can provide in many cases is confirmed in practice. But it is important here, as experience has shown (which incidentally was not always successful), to place the stress precisely and determine the priorities correctly for the goals of the units that comprise the complexes. For the most significant, deep-seated tendencies in developing science are, in the final analysis, always determined by social and historical practice by the level of its development and by its requirements. F. Engels defined this process impeccably accurately: "If technology depends to a great degree on the state of science then science depends to an even greater degree on the state and requirements of technology. If a technological requirement appears in society it moves science further forward than dozens of universities."

It should be noted that the single official legally sanctioned form of integrating science and production at the present time is in scientific-production associations, the head structural unit of which can only be a scientific research, structural, structural design or technological organization of the ones that make up the NPO according to the statute on scientific production associations. Unquestionably such a form has the right to exist. However, as comrade L. I. Brezhnev noted at the 26th Congress, improving the organizational structure of management will not tolerate stagnation. It is impossible to adapt a living, growing organism for managing the economy to the regular typical forms. On the contrary, the forms must be adjusted in accordance with changing economic goals.

In our view such a new form which, incidentally already actually exists and has been extensively used, is the production and scientific association (PNO) with which one can group the "AvtoZIL" [Motor Vehicle Plant imeni Likhachev], "AvtoVAZ" [Volga Motor Vehicle Plant], "BelavtoMAZ," LOMO [expansion unknown], "MTZ imeni V. I. Lenin" and many other production associations. It is no coincidence that the "AvtoZIL," LOMO and "Elektrosila" production associations were named as being among the more successful examples of integrating science and production at the the 26th Congress and not the NPOs which, on the one hand, have not been widely used (at the beginning of the current five-year plan they numbered about 200 in

the country) and on the other hand, many of the NPOs are also gravitating toward solving primarily production problems in their activities. This is no accidental process; it is caused by objective and subjective reasons. Thus, as is well known, the NPOs are lagging behind the five-year goals for creating new technology. Material and technological provisions and financing are provided only for a year, as a result of which long-range scientific and technical problems are not tied to financial and material provisions and capital investments.

Indicators are given to experienced plants that are analogous for all industrial enterprises which clearly does not promote the creation of an improved product or a reduction in material and labor consumption in the NPO. Labor expenses for manufacturing experimental batches of parts, and even more so for experimental models, are, naturally, much higher than for turning out serial products. The use of labor productivity indicators by NPOs that are calculated in the traditional manner for serial production gives a distorted picture of its dynamics. In addition the primary methodological question of reflecting all the results of one's activity in commodity production has not been solved.

Science and production planning is done separately in an NPO since various sources of financing promote these types of activities a great deal. Therefore science and production interests do not coincide among the partners at the association. Varying indicators cause two balances for primary activity in the NPO under the best circumstances. Organizations and enterprises that are included in the make up of an association lose the right to a lawyer and forfeit their current account in accordance with the statute concerning NPOs. As a result several balances exist in a single current account. Under these conditions the accounting function cannot practically be centralized and the NPO is deprived of the possibility of drawing up a single financing plan. The practice of bookkeeping reflects the disassociation of the production and economic interests of the units in the structure. And the USSR Gosbank department often refuses to grant credit to an NPO due to the difficulty in controlling the credit capability of organizations where several balances exist.

The activities of the NPO are complicated even more by the fact that a typical structure for the agency that governs them, salary schemes and regular schedules are lacking. Centralizing the management functions is also hampered by the differences in wages for specialists in corresponding subdivisions in scientific research organizations and production structural units.

We would note, incidentally, that workers in the head institute are awarded bonuses in amounts that are noticeably less than workers in the structural units that they manage. Bonuses are paid out quarterly in institutes while they are paid out monthly in production subdivisions. Administrators of the head institute forfeit the bonus in the event that the plan is not met by the production subdivisions but are in no way encouraged to successfully complete it.

Thus, NPO administrators are deprived of maneuverability in personnel questions. In addition, variations in wages and the entire bonus system practically makes it impossible to turn NPOs into unified scientific technical and economic complexes.

The above management agencies that are under the jurisdiction of an NPO attempt to take on a maximum amount of production tasks in such a manner that all their machine tools are engaged in turning out serial products. Because of this, along with the insufficient development of an experimental base, the NPO is hindering the rapid creation of new techniques and advanced technology and this is leading to the moral aging of scientific and technical approaches and ideas that have already been worked out.

The fact that the NPO is formally close to being created in a number of sectors must be given attention. Several of them are actually disassociated organizations that are oriented basically toward serial production. There are also examples of NPOs being eliminated.

In his speech at the 26th CPSU Congress First Secretary of the Belorussian Communist Party Central Committee T. Ya. Kiselev said: "Meeting the goals set forth at the congress for completing the transition of the economy to an intensive method of development obligates us to increase our attention to the problems of accelerating scientific and technical progress and to search for effective forms of integrating science and production." The reorganization (more precisely, the legal recognition) of the leading production associations of Belorussia into production scientific associations could become such a form, which at the same time is a less painful solution to the urgent problems of integrating individual scientific research and design institutions with production.

Thus, the union of the Minsk NII EVM [Scientific Research Institute for Computers] and MPOVT looks quite alluring. They are under the jurisdiction of one main administration in their ministry, they are located in a single production area, the NII EVM grew from a design bureau at a computer technology plant, such a structural unit is needed for the long-range development of the association and specialists at NII EVM will not look for work for themselves throughout the entire country from Vladivostok to Brest.

The union of the Minsk Structural Technology and Experimental Institute for the Motor Vehicle Industry (MKTEIavtoprom), a branch of the Gor'kiy Scientific Research Institute for Mechanizing and Automating Control Over Production, and the Minsk Scientific Research and Structural Technology Institute for Casting Production in the Motor Vehicle Industry (NIILITavtoprom) with the "BelavtoMAZ" PO, which are located not only in Minsk but in one plant region, looks no less alluring.

It seems that only by means of forming PNOs is it practically possible to draw science close to production, and to obtain a high output from each association in the matter of scientific and technical progress. It goes without saying that these problems cannot be solved without the practical assistance and support of the appropriate union ministries and departments.

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## INTENSIFICATION IN SPHERE OF SCIENCE AND TECHNOLOGY SOUGHT

Moscow EKONOMICHESKAYA GAZETA In Russian No 37, Sep 82 p 16

[Article by V. Pokrovskiy, doctor of economics: "Intensification in the Sphere of Science and Technology"]

[Text] Over four million people in our country are working in science and science service, in the planning and design institutions and subdivisions of the industrial sectors and production associations. The sphere of activity for the development of science and technology plays an increasing role in improving the effectiveness of social production, decisively determining the rates of scientific-technical progress.

Despite all the uniqueness of the "production" processes in this sphere, questions of their intensification, and more complete use of the intensive factors are just as urgent as in the entire national economy, although the methods of implementation of intensification and the summary indicators are specific and have their own features.

### Series Output, Economic Effect

The significance of the final results of functioning in the sphere of science and technology is expressed not only in the number of completed studies and developments (although their number steadily rises and averages about 200,000 per year) or introduced measures for new equipment (roughly 800,000 annually). Of decisive importance is the number of created machines and those which have started series manufacture, equipment, apparatus and instruments (an average of 6,800 names per year in 1966-1970, 13,200 in 1971-1975, and 13,700 names in 1976-1980) as well as the economic effect from introducing scientific-technical measures. Its quantity in 1970 was R 2.6 billion, in 1980 R 4.8 billion.

In 1.5 years of the 11th Five-Year Plan, about 5,000 samples of new types of machines, equipment, apparatus, instruments and automated equipment have been created. The percentage of products of the highest category of quality in the total volume of production exceeded 15 percent.

The use of program-target methods of planning promotes intensification of the orientation of scientific and technological development on high final results. Thus, as a result of realizing the 170 scientific-technical programs of a national level planned for the 11th Five-Year Plan, it is intended to obtain

an economic effect totaling R 25 billion in calculation per volume of introduction of 1985. This is more than from all other scientific-technical measures implemented during the five-year plan in the national economy. It is precisely for this reason that a lot of attention should be focused on fulfilling the plans for realization of comprehensive programs. The state plan for the first six months of 1982 in the nomenclature for scientific-technical programs has been fulfilled by 93 percent, but for introduction of new equipment only by 79 percent. This naturally results in a decrease in the obtained effect.

For more accurate evaluation of the final results of the labor of the workers creating the new equipment, it is necessary to improve the technique of determining the effectiveness of the new equipment, to calculate the actual effect obtained from using it.

### Cycle of Introduction

Under conditions of a transition to the intensive path of development, organizational forms of connecting science with production acquire exceptional importance. They are aimed at the most rapid realization of the results of the entire cycle "science-equipment-production." These are primarily the scientific-production associations which have won widespread acknowledgement which make it possible to reduce the cycle of introduction of scientific-technical achievements 1.5-2-fold. A total of 250 of these scientific production associations have already been created in the country.

The ministries and departments should analyze the composition of the already created associations, and bring it into correspondence with the goals of their activity defined by the statute on the scientific-production associations; they should concentrate efforts on developing new samples of equipment and new technologies and materials. Today many scientific-production associations include large industrial enterprises involved in series production, while the cycle "science-production" does not always represent all the necessary research, set-up and adjustment, and experimental links.

Because of the considerable intensification of the dependence of the rates of growth in efficiency of social production on the rate and scales of dispersal of the latest technologies, primarily intersector application, the question of concentrating the technological potential is especially acute.

The powerful sector technological centers created in a number of machine construction industries have recommended themselves as an effective form of this concentration. They afford possibilities for more rapid development and centralized dispersal of new ideas and methods of technological processing in scales of the entire sector. The product of these centers which include scientific research institutes, technological organizations, design offices, experimental bases and industries, is new technological solutions and technological equipment created on their basis, including nonstandard, on whose bases long-term tasks of technical re-equipping of the sectors are solved. On the agenda is creation of intersector technological centers which service a number of sectors or individual regions. An example may be the organizations which specialize in the area of powder metallurgy.

## Problem of Fund-Equipping

The trend has recently been observed of improving the level of fund-equipping of the workers in the sphere of science and technology. In 1966-1980 the outlays for payment of active work (wages fund) in the sphere of development of science and technology increased by more than double, and the outlays of social labor (acquisition of equipment, instruments and experimental equipment) roughly 4-fold. However, according to the level of fund-equipment and the rates of its increase, the sphere of scientific technology is significantly lagging behind material production.

The insufficient level of equipping with experimental bases has an especially unfavorable effect on the efficiency of labor of the creators of new equipment. Analysis indicates that in the last 10 years, the specific weight of allocations for construction of these bases in the total capital investments of the sectors did not increase and was less than 1 percent. The plans for construction are systematically not fulfilled. Even for the national scientific-technical programs in the 10th Five-Year Plan, the assignments in this area were fulfilled by roughly 60 percent.

Practice indicates that the scientific organizations which have a high level of equipping with experimental equipment, experimental base and scientific equipment achieve exceptional advances in realizing their work. Thus, the institute of Electric Arc Welding imeni Ye. O. Paton (Kiev) annually guarantees production in the national economy of about R 150 million of economic effect. In our opinion, in order to improve the efficiency of functioning of the sphere of scientific technology, it is expedient to introduce state regulation of the percentages of outlays aimed at developing its experimental base. These outlays should be planned by individual construction in the capital investments, and the corresponding limits of contract work should be set. At the same time planned and organizational measures are needed for development of scientific instrument making with regard for the future nomenclature of the required instruments and equipment.

## Purposefulness of Resources

According to the estimates of specialists, in the science of the USSR in the last 10 years the ratio of outlays for the development of basic research, for applied research and development was 9: 28: 63 (in percents). With regard for the expenditures for introduction of new equipment, the distribution is roughly the following: basic research 5, applied 18, development 56, introduction 21. Analysis of this ratio, and the potentialities for using the already created potential of developments indicates that it is now expedient to focus attention on the outlays directly associated with the introduction of scientific-technical results, and to enhance the percentage of these outlays.

Under conditions of intensification, the role of basic research aimed at accelerating scientific-technical progress rises. But there are many scientific institutions, generally small ones, which have a scattered subject matter, and are developing topics which are far from the decisive trends of scientific-technical progress.

Although the average volume of one topic fulfilled since 1970 until the present increased almost double, a considerable number of works, almost one-third of the topics, are small with a volume of less than R 20,000. It is understandable that they do not have a significant effect on improving the effectiveness of the production sectors.

Precisely for this reason in addition to the national regulation of the accelerated growth in investments aimed at basic research, the enlargement of the subject matter of research and development acquires especial importance. As indicated by the experience of Tatariya for enlarging scientific-technical measures, reduction in the quantity 3-6-fold and increase in outlays for one measure 4-8-fold, and increase in the economic effect 12-16-fold is guaranteed.

In solving the task of rapid development, mastery and introduction of scientific-technical achievements, situations develop more often which require a jump-like increase in allocations in the latest scientific direction. It seems that the central agencies of planning must have for these purposes not only reserve of equipment for scientific research, but also for designing, developing new equipment, as well as capital investments and currency resources. This would significantly improve the rapid evolution of work to create and develop new equipment, and would promote reinforcement of the priority of our country in the development of original innovations.

#### Cadre Potential

In science, as in no other sphere, efficiency to a dominant degree is determined by the quality of the cadre potential. Therefore a constant improvement in its structure, enhancement in the qualification of the workers, and mainly, renewal of their composition are important means of further growth in its results.

In 1961-1965, the average annual increase was 9 percent, in 1971-1975, 4.8 percent, and 1976-1980, 2.1 percent. A similar situation occurred with the rates of growth in the number of scientific and scientific-pedagogical workers. At the same time, the volume of work done by one scientific worker increased roughly 1.5-fold from 1965 to the present.

In the future, the tasks of improving the effectiveness of functioning of all links of science and technology on the condition of even a certain reduction in the number of workers can, in our opinion, only be solved on the basis of using more advanced forms of organization and stimulation in scientific labor than today. It is useful, for example, to make more complete use of the experience accumulated in the All-Union Institute of Welding Production (BISP) of the Ministry of Machine Tool Construction. The experimental method used in it stipulates a gradual decrease in the standard of the fund of wages per ruble of planned volume of work, as well as expansion of the rights of the director in paying the workers who successfully fulfill significant volumes of work. Saving of the wages fund from release of workers goes to provide additional payments for wages and bonuses. In combination with a set of organizational measures, this made it possible to significantly improve the volumes and effectiveness of the work done even with a certain decrease in the number of workers.



In our opinion it is expedient to somewhat change the formed principles of the system for certification and competitive selection of the specialists. In particular, the selection of scientific workers by competition could be linked with the fulfillment of specific assignments of the research (development) plan in definite periods. At the end of these periods, the labor relationships between the administration of the scientific institution and the scientific worker could be considered cancelled.

It is necessary to have a systematic evaluation of the scientific-technical activity of the scientific institutions and rapid reconstruction using the results of evaluating their organizational structures. This work should be combined with intensifying the efficiency of the cost accounting system of organizing development for new equipment which will make it possible on the average to reduce the periods for their conducting and introduction by 20-40 percent.

Thus, one could make wider use of the known experience of the all-union scientific production association "Soyuzgazavtomatika" in the area of improving the flexibility of organizational structures by forming comprehensive creative brigades for the period of creation and complete development of new types of equipment.

The appeal to the valuable experience of the scientific and production collectives of Moscow for development of a specific program of action to strengthen the ties between science and production, its technical re-equipping, improvement in the quality of products, and in the final analysis, for conservation of all types of resources based on accelerated introduction of the achievements of science and technology may provide great assistance.

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## IMPORTANCE OF COMPETITION IN SCIENTIFIC-TECHNICAL SOCIETIES STRESSED

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 82 p 15

[Article by N. Gritsenko, first deputy chairman of the all-union council of scientific-technical societies: "Competition and Comprehensive Programs"]

[Text] Strengthening of the bond between socialist competition and the economic mechanism today is becoming one of the basic directions of work to improve its efficiency. It was stressed at the 17th USSR Trade Union Congress that competition today is aimed at achieving the best final national economic results. All-union socialist competition of the collectives from scientific-research, planning, technological and design organizations, associations and enterprises for successful fulfillment of the assignments of the target comprehensive scientific-technical programs and the programs to solve the most important scientific-technical problems makes it possible to direct the efforts of the competitors to solving the central problems of the five-year plans in the area of scientific-technical progress. Participation in this competition of the scientific-technical societies of the country is an important way to improve the efficiency of their activity, and increase the real contribution to the fulfillment of the five-year assignments.

Based on the Contracts of Cooperation

A total of 170 comprehensive scientific-technical programs have now been developed and implemented. They stipulate the creation of over 4,000 samples of new equipment and technological processes. Roughly 60 percent of them are to be put into production in this five-year plan already. Their realization will conserve labor of 4.2 million workers, 13.4 billion kilowatt-hours of electricity, 108 million tons of conventional fuel, and about 7 million tons of metal.

The collectives working on fulfillment of the program assignments are competing for early, effective and high-quality completion of work based on contracts for creative cooperation. This competition makes it possible to accelerate the cycle "research-development-production." Its motto is "New Equipment in the Forefront of the Five-Year Plan."

A total of 22 collectives of scientific-research, planning, technological and design organizations, associations and enterprises have been named among the winners of the all-union socialist competition for 1981. They achieved the best results in realizing the assignments of comprehensive scientific-technical programs.

The 436 certificates of authorship, 57 patents, 16 licenses indicate the technical-economic development, and the economic effect of introducing them was R 145.8 million.

For example, at the Cherepovets Metallurgical Plant imeni 50th Anniversary of the USSR, improved converters with capacity of 400 tons together with mobile mixers with capacity of 600 tons have been put into operation. The equipment of the set was made on the level of the best foreign samples. New technical solutions made it possible to reduce the specific metal consumption by 10-18 percent, and to guarantee conservation of over one million m<sup>3</sup> of natural gas per year. The time for maintenance and repair of equipment diminished by 4 percent. Productivity of the converters increased by 10 percent. The annual economic effect with production of 2.5 million T of steel in 1981 was 5 million rubles.

Having been included in competition for a worthy meeting of the 60th anniversary of formation of the USSR, the collectives of the Central Scientific Research Institute of Paper (TsNIIB) and organizations of the co-executors were obliged to complete ahead of schedule the assignments for the program to develop and to master technological processes and equipment for production of new types of pulp and paper products.

The socialist commitments in whose substantiation and realization the scientific and technical society is actively participating, have outlined fulfillment of the assignment for the development and mastery of new technological processes and materials which guarantee decrease in density of a square meter from 51 to 45 grams, improvement in the quality and expansion and assortment of printed types of paper 6 months ahead of the established schedule. The organization of scientific research work is being improved for these purposes, and the quality of the standard-technical documents and preparation of production are being improved.

At the Kondopoga and Balakhnin pulp and paper combines, for example, it has been planned to develop technological regimes for production of thin newspaper ahead of schedule in honor of the 60th anniversary of formation of the USSR, and in the publishing houses "Pravda" "Moskovskaya Pravda" the technology for printing on it.

The introduction of new technologies will make it possible to reduce the mass-consumption of paper by 10-12 percent, to annually conserve up to 200,000 m<sup>3</sup> of wood raw material, 15 million kilowatt-hours of electricity, and to reduce the transport costs by 10 percent. The annual economic effect exceeds R 8 million.

In order to fulfill work, a plan-schedule has been compiled and contracts have been concluded for creative cooperation. Comprehensive creative brigades of workers of science and production have been set up in which competition has developed for the personal creative plans. The headquarters of competition with the participation of representatives of the administration and public organizations of all the co-executors which has been set up in the TsNIIB as the main organization is monitoring the realization of the contracts.

## What is New in the Organization of the Competition

The accumulated experience of working to fulfill assignments of the programs made it possible to improve organization of competition.

The AUCCTU and the State Committee for Science and Technology have approved the conditions for the all-union socialist competition of the participants for realization of the programs. A total of 25 challenge red banners of the CPSU Central Committee, USSR Council of Ministers, AUCCTU and Komsomol Central Committee with diplomas and monetary prizes have been established for the main winning organizations, and for the co-executors, diplomas of the AUCCTU and State Committee for Science and Technology and monetary prizes. The results of the competition are summarized annually. The scientific-technical societies have adopted patronage over 56 scientific-technical programs. Coordination groups have been created for each of them, long-term plans of scientific-technical, organizational and propaganda measures are being taken. A number of central boards of the scientific-technical societies have instituted prizes and diplomas for successful fulfillment of the programs. They have stipulated incentive within the framework of the conducted public inspection for new equipment. The all-union council of the scientific-technical society and the newspaper IZVESTIYA have established honorary diplomas and memorial pins "Scientific Equipment in the Forefront of the Five-Year Plan" for the winners of the competition.

The scientific council of the USSR Academy of Sciences and AUCCTU on problems of socialist competition and the All-Union Scientific Council of the scientific-technical society have developed recommendations for improving the effectiveness of competition for successful fulfillment of the programs. On their basis, the sectors and regions, and enterprises have supplemented the conditions for competition of specialists on personal and collective creative plans. At the same time, the competition of the specialists is linked more closely with the solution to the most important tasks of the five-year plan. This is enormously important for improving the efficiency of this mass form of competition. For example, in the Ukraine, about 1.7 million engineers and technicians are working on them, 86 percent of the total number of members of the scientific-technical society in the republic. Over 2.5 million suggestions have been developed and introduced on the creative plans in the first year of the five-year plan. Their realization made it possible to release over 120,000 workers from manual labor, to save over 530,000 T of metal, and about 730,000 T of conventional fuel.

At the same time it has become necessary to further improve the organization of competition. It is thus important to improve the system of evaluating indicators which are taken into consideration in summarizing the realization of different programs, whose fulfillment is distinguished by schedules, scales, conditions and the degree of training of the cadres. The comparability of the results is now based on technical-economic indicators of the new equipment. However in this case potentialities of the collectives creating the equipment are not always taken into consideration. It would be correct, in our opinion, to summarize by groups of comparable scientific works in a differentiated way

The weak place in the organization of competition is still publicity. In many organizations and enterprises there are no competition screens, rapid information about the course of fulfillment of the scientific research by programs has not been set up. The plant press and broadcasting are not used effectively everywhere.



The ministries, trade union central committees jointly with the central boards of the scientific-technical society should hold more frequent seminars of the organizers of competition based on the main organizations, the winners of competition where the participants could become more familiar with practice and the experience of working on programs and control of competition. More attention should be focused on the dissemination of the experience of the leading collectives, and especially those who have been put on the all-union honor board of the VDNKh [Exhibition of Achievements of the USSR National Economy].

#### Role of the Competition Headquarters

Active role in achieving a high technical-economic level, quality of the machines, equipment, and processes created within the framework of the program belong to the headquarters of competition and the coordination councils in the main organizations. It is expedient to create them for each program (including for sector and regional), and to provide material and moral means of incentive. This work must be agreed upon with the leaders of the programs and coordination councils of the scientific-production society on programs and groups of information support. All of this proposes preparation of a general statute on the headquarters of competition with clear determination of its functions. This will significantly facilitate the task of the competition organizers.

The councils of the primary organizations of the scientific-technical society must take more active participation in the work of the competition headquarters, set up contacts with the subcontractors, make more frequent examinations at their meetings of questions of fulfilling the assignments of the programs, participate in organizing the coordination conferences, prepare contracts, network plan-schedules of work with the co-executors, hold joint conferences, target competitions, and inspections. However the latter must not be the end in itself in the activity of the scientific-technical society. The results of the work, as stressed at the last congress of the trade unions of the country should be measured not in the number of recommendations, the number of conferences, inspections and competitions held, but by the specific contribution to the fulfillment of plans of new equipment, to solving the urgent scientific-technical problems.

It is necessary to intensify monitoring on the part of the ministries, central committees of the trade unions, central boards of the scientific-technical society for realization of the programs. It is necessary to make a quarterly examination of the course of their fulfillment at joint meetings of the boards and presidiums, to reveal the reasons for lagging in individual assignments and stages, in order to eliminate in time the available shortcomings.

It is thought that the USSR State Committee for Science and Technology, the all-union council of the scientific-technical society jointly with the AUCCTU should examine the question of transforming the commission for summarizing the results of the all-union competition for successful fulfillment of the programs to a permanently active one. This will make it possible to rapidly examine questions which develop during competition, and to more rapidly disseminate the leading experience of the competitors.

The delegates of the 17th USSR Trade Union Congress spoke about these questions at the plenary meeting and at the section for socialist competition and improvement in creative activity of the laborers. The section recommended strengthening attention to completion of the forms and methods for organizing

competition for all possible acceleration of scientific-technical progress, successful fulfillment of the assignments of scientific-technical and social-economic programs, efficient use of the achievements of science and technology. The tasks set before the scientific-technical society in the resolution of the congress were made specific at the plenum of the all-union council of scientific-technical societies which took place in May.

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## PROBLEMS OF DEVELOPING TERRITORIAL-PRODUCTION COMPLEXES DISCUSSED

Moscow PRAVDA in Russian 19 Oct 82 p 2

[Article by academician N. Nekrasov: "A Complex Is Formed"]

[Text] One of the remarkable features of the economic development of the Soviet Union is the broad development of regions which have high concentration of natural resources. This direction of socialist competition indicated by V. I. Lenin made it possible to create a powerful energy and raw material potential. Now the extracting industry has made a forced advance to the east and the extreme north, to the deserts and semideserts of Kazakhstan and central Asia. The scales and rates of such purposeful use of natural resources are unprecedented for the world economy. The accumulated experience has had a fruitful effect on the arrangement of productive forces over the entire country.

At the same time, we are awaited by intensive growth in consumption of different types of natural resources both in the near future, and especially in the long-term future. Consequently, everything associated with improvement in their study, exploration, extraction, comprehensive use of all the raw material components deserve the most intensive attention.

Comrade L. I. Brezhnev at the 26th CPSU Congress noted: "The advances of the entire national economy will depend a lot on improvement in the efficiency of the extracting industry. The path to this is acceleration of scientific-technical progress, comprehensive and deep refining of minerals, and broader use of secondary resources."

The systematic study of natural warehouses that was started over 50 years ago indicated that our country has practically all types of raw materials and energy resources. However, many of them are mainly located in distant northern territories where there is practically no population, and the climate conditions are very harsh.

For large-scale and diverse development of natural resources of the country as a whole and especially in remote northern regions, the creation of territorial-production complexes has primary importance.

At the first stage of state planning in the USSR, a clear example of their organization was the solution to the problem of the Urals-Kuzbass which was started in 1930 and was grand for that time. After the war, the system of these complexes was formed on the Angara and Yenisei. In Kazakhstan, the Pavlodar-Ekibastuz was born. At the Kursk magnetic anomaly, a powerful iron ore base developed.

In addition to improving the complexes that were formed in the last 10-15 years, new territorial-production complexes were rapidly formed. A brilliant achievement of Soviet economy is the creation of the West Siberian oil and gas complex which is unprecedented in scales.

As indicated by scientific and planning studies, in the near future new large territorial-production complexes will develop. We are concerned with the creation in the Krasnoyarskiy Kray of the KATEK, the Kansk-Achinsk base for Siberian electricity and energy-intensive industries. The industrial development of diverse riches of the northern Krasnoyarskiy Kray is very enticing. In addition to very valuable nonferrous metals, apatites, graphite, and iron ores have been found there. The Turukhanskiy basin with its large reserves of coking coals have been known there from ancient times. Here there are large resources of mature and overmature wood. The problems of the formation of this complex are being studied.

On the vast zone of the territory of influence of BAM [Baykal-Amur Trunkline] the scientists are proposing formation of a number of new complexes. This will make it possible to pass to a broad industrial operation of the richest natural warehouses which have become accessible because of construction of the Baykal-Amur trunkline.

In the republics of central Asia and Kazakhstan, formation of an interrepublic East-Caspian complex has been outlined based on the use of oil and gas fields of the near-Caspian, as well as the chemical raw material of Kara-Bogaz-Gola. The creation of an industrial complex for the use of the mineral raw material of West Turkmeniya is proposed. The scientific and planning organizations are conducting studies and are developing planning materials for the formation of the East Kirghiz complex which stipulates the supplementing of the water resources of Lake Issyk-Kul', as well as organization of extraction in large scales of valuable types of raw material.

Thus, our country for almost 50 years has been systematically covered with a branched network of territorial-production complexes with different structure of production. Their main task is the broad comprehensive national economic development of certain regions, guarantee of the needs of the national economy with raw material and energy not only before the end of our century, but even beyond the limits of the year 2000.

The creation of a harmonious, well-organized system of territorial-production complexes is a powerful lever for enhancing the effectiveness of the national economy. This is one of the most important factors which determine the further intensive development of the productive forces of the country.



The normal growth in the formed and the formation of new territorial-production complexes depend a lot on the correct solution to the planned and organizational-managerial tasks, the operational supervision both locally, and on the part of the central agencies. A lot has been done for this purpose. The USSR Gosplan has approved the method instructions for solving problems of the formation of the territorial-production complex. The scientific organizations have developed plans for long-term development of a number of formed complexes. For the West Siberian oil and gas complex, an interdepartmental territorial commission has been set up in the USSR Gosplan. Planning has also been introduced for a number of territorial-production complexes of an individual construction site which is very important for the more correct use of capital investments.

However the creation of the system of the territorial-production complex and each one of them separately is still obstructed by the departmental separateness and the narrow sector approach which has not yet been overcome. They do considerable damage and significantly reduce the efficient use of natural resources. They entail enormous losses of valuable industrial raw material. There are unfortunately, many examples of this. We will only dwell on some which require urgent practical measures.

The question of organizing the Kola mining-industrial complex has been urgent for a long time. The characteristic feature of the mineral raw material here is its multiple-component content. It is urgently necessary to set up the situation so that even now they are managed in a business-like manner. More than 50 years ago, the specialists of the USSR Academy of Sciences established the need for joint industrial use of the Kola apatite-nepheline ores. But until now only a small part of the nepheline has arrived at the Pikalevo plant, and more that 80 percent of the most valuable raw material for the production of claydite has been dumped.

In order to avoid this, it was decided in 1967 to build several cement-claydite plants based on the Kola nephelines obtained on the side. However the departmental disagreement between the ministries of nonferrous metallurgy, chemical industry, and industry of construction materials interfered with the fulfillment of the solution. This cost annual losses of no less than one million tons of claydite, about one million tons of soda products and roughly ten million tons of Portland cement. At the same time, the ministries continue to spend currency on buying foreign bauxites and caustic soda, while the association "Apatit" has to spend considerable capital on storing nepheline waste. Some of them were discharged for a long time into Lake Imandra, where a considerable "man-made" field of valuable raw material was formed. There has not yet been felt any interest of the ministries in solving the problem.

The titanium-containing raw material, rare metals and other elements are not extracted from the Khibinskiy ores, although the technological processes have been developed. There is no interest in the largest field of the Kola kyanite, the raw material for obtaining silicon-aluminum alloy--silumin. There are considerable losses of mica, and vermiculite and other valuable types of raw material are almost not used.

If we want to decisively avoid these losses, it is time to pass immediately from discussions about organizing the Kola mining-industrial complex to doing it. Its formation and operation should be under the observation of the appropriate departments of the USSR Gosplan and the RSFSR Gosplan.

Here is another example of a narrow-departmental approach. The country needs titanium raw material, in particular for producing white pigments and enamels, they are partially imported from abroad. At the same time in the Komi ASSR, the Yaregskiy field of titanium ore has been prepared for industrial development. It was proposed back in 1976-1978 that an experimental-industrial mining-enrichment combine be put into operation. But its construction was not completed, again because of departmental approach to the situation. The USSR Ministry of Nonferrous Metallurgy, on whose balance the Yaregskiy field is counted, was not interested in involving its resources in the economic turnover. The Ministry of the Oil Industry was less inclined to this, because it was involved here in extracting oil, while the Ministry of the Chemical Industry which needed the titanium raw material, was not working since the Yaregskiy field was "foreign."

By the way we should say that in the West Siberian oil and gas complex, the narrow departmental approach as before makes itself known. They have not yet succeeded here in achieving the necessary proportionality in the development of the industrial and civil construction, production and social infrastructure.

Efficient control of the territorial-production complexes is one of the most urgent tasks for the national economy. The further expansion of the power engineering and raw material potential of the country depends a lot on its correct solution.

Among the scientific-technical problems associated with the formation of the territorial-production complex, we should pay attention to the new equipment of the transportation links, especially for northern conditions, as well as the highly effective technological processes. In the oblast, transporting of oil and gas has enormous achievements. Experience has been accumulated in constructing a gas-pipeline system which does not have an equal. It remains to improve it by constructing gas pipelines which are designed for pressure of 100-120 atmospheres. This will significantly increase their productivity.

In addition to the ground transportation, in my opinion, we need to organize dirigible construction on a modern technical basis. Dirigibles are very necessary for operations on vast spaces of the north. In many regions of the country warehouses of mineral raw material are known and are discovered which have certain features. It is not possible to do without the development of new, often original technological processes. Therefore the task is raised of organizing on broad scales an experimental-industrial research technological base.

Of course, the creation of a well set-up system of a territorial-production complex requires considerable time and intensive work of many central, republic and local agencies. Its formation requires the urgent solution to the planning-organizational problems associated with this.

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## ACTIVITIES OF SCIENTIFIC AND TECHNICAL SOCIETIES

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 9, Sep 82 pp 70-72

[Article by Candidate of Technical Sciences V. Bespyatyy and I. Grishanina: "Special-Purpose Planning of the Work of Scientific and Technical Societies" under the heading: VOIR [All-Union Society of Inventors and Efficiency Experts] Activity.]

[Text] An effective form of creative collaboration between scientists and industrialists is the practice of concluding comprehensive agreements for cooperation in a distinct period. In the years of the last five-year plans, this form of collaboration has shown itself to be highly effective and was widely used.

Agreements on creative collaboration became a traditional form of cooperation for the institutes and enterprises of Kiev. In the 9th Five-Year Plan the scientific and industrial groups of the city concluded 500 such agreements, and in the 10th, there were more than 1000 of them. In the 11th Five-Year Plan Kiev enterprises have concluded agreements for collaboration with scientific groups on current and long-term questions.

A feature of the agreements on collaboration is that the first stage of a scientific and technical search goes on without mutual financial accounting. In the beginning of the economic agreements, interrelationships are deepened and the solution found is led up to a stage for practical introduction with all financial considerations. It is precisely on this basis that, in the shortest possible time, the Institute of Superhard Materials of the UkSSR Academy of Sciences created an automated production line for processing turned sleeves at the Plant imeni Lepse. As a result of this, metal consumption was reduced by 40 percent, the quality of the products was substantially increased, and the annual economic gain amounted to one million rubles. The Plant imeni Lepse became the support center for advanced casting technology not only in Kiev, but for the whole industry.

As pointed out by L. I. Brezhnev at the 26th CPSU Congress, the deep, hidden potentials in the use of new technologies, designs, and organizations of labor should now be sought out. That which lies on the surface already is practically used up. Consequently, new organizational forms for the planning and administration of scientific and technical progress are needed.

The comprehensive special-purpose programs which emerged in 1978 at the initiative of the Institute of Cybernetics of the UkSSR Academy of Sciences and the Scientific Research Institute of Experimental Design for the Kiev Region of USSR Gosstroy have become a new form for agreements on creative collaboration. The scientific and technical community supported the experiment and the programs "Kievinstrument [Kiev Tool]", "Kievshtampovka [Kiev Stamping]", "KievChPUeffekt [Kiev Numerically Programmed Control Effect]", "Kievlit'ye [Kiev Casting]", and others were created.

The fundamental purpose of organizing scientific and technical work in the city in comprehensive special-purpose programs was the consolidation on community principles of the efforts of the collectives of the various departments situated in the Kiev area for the solution of urgent scientific and technical problems. The city's special-purpose programs were directed to the solution of those questions which either are not included in industry programs for scientific research and development in the near future, or which can be solved only on an inter-industry level.

The long-term comprehensive program "Kiev Tool" is an example of the effective fulfillment of a program in the course of carrying out which, a transformation takes place in the patterns of the work places and the tool services of the enterprises of the city. The tool services of the enterprises participating in comprehensive special-purpose program - the PO [Industrial Association ?] imeni S. P. Korolev, the Motorcycle Plant, and the Stamping and Automatic Machine Plant imeni A. M. Gor'kiy became centers and they are promoting the wide dissemination of their experience in other enterprises. In drawing up the "Kiev Tool" program, commissions were created within the city committee of the Party [gorkom] on new materials and tools made from superhard materials. The commissions organized a survey of the tool service of the participating enterprises and prepared the plan for its reorganization.

The effectiveness of this and other programs is provided for by accurate planning of the whole complex of operations and by collective monitoring of their fulfillment. The rendering of technical assistance to small enterprises enters into the undertakings of the programs. The financing and material and technical provisions for the developments, as a rule, are produced by the enterprises at which they are carried out.

The Council for Cooperation on Scientific and Technical Progress of the gorkom, consisting of the leading scientific and industrial leaders, specialists, and party workers, is at the head of the organizing and coordinating of work on strengthening relationships between science and industry.

For cooperation on scientific and technical progress, at the enterprises of the city 23 commissions were created in the gorkom, 15 of which are specialized along specific technological lines having broad inter-industry orientations; namely, in the areas of electric welding, automating of design, the creation of new materials for tools, ASU [automatic control systems], and so on. Seven commissions are specialized on industrial problems (construction, transport, sewage, and also tanning and shoe production).



The industrial NTO [Scientific and Technical Societies (STS)] are receiving still greater opportunities for work within the frameworks of the educational scientific professional associations (UNPO). The efforts of scientists working within the system of higher educational institutions and the UkSSR Academy of Sciences, and also scientists and specialists in the industrial sphere who are directed toward the solution of problem-solving questions, improving the quality of the training of young specialists by bringing the teaching process as close as possible to production, increasing the qualifications of specialists, improving the form of idea-generating work, and improving the relationship of science with industry, are concentrated in the educational scientific professional associations [ESPA]. The ESPA operate on community principles and do not infringe on the productive economic structure or the departmental subordination of the organizations entering into their composition.

The organization of such associations permits stabilizing and making the relationship between science and industry more long-term. The conduct of research within the framework of ESPA creates the prerequisites necessary for the solution of large complex scientific and technical problems. To a significant extent this promotes the development within the framework of ESPA of operational plans combining the efforts of science and industry on all the links of the chain of scientific and technical progress; namely, the training of personnel, the development of scientific and technical ideas, and their experimental verification and introduction.

The 13 ESPA created in Kiev embrace 13 industries and 70 enterprises and organizations. The largest ESPA ("Geodezkarta [Geodesic Map]" "Chistaya Voda [Pure Water]", "Elektonika [Electronics]", and "KievEVMproyekt [Kiev Computer Project]") were formed on the base of the State University, and the polytechnical institute ("Gidrprivod [Hydraulic Drive]", "Kibernetika i metrologiya [Cybernetics and metrology]", "Elektronmash [Electronic Machine]" and "Arsenal [Arsenal]"). In addition, such ESPA as "Kievmyaso [Kiev Meat]", and "Kievmoloko[Kiev Milk]" were created.

The organization of work according to comprehensive special-purpose programs and ESPA permitted achieving steady operation of the enterprises who were participants in these forms of the relationship of science with industry. In the years of the 10th Five-Year Plan, of the 320 industrial enterprises in Kiev, 300 operated steadily and fulfilled the plans according to all the indicators.

Scientists of Kiev in collaboration with industrial personnel during the years of the past five-year plans introduced developments with an economic gain of more than 2.5 billion rubles for the country, including 250 million rubles for city enterprises. The yield per ruble of expenditure on NIR [Scientific Research Work] in the scientific research institutes of the city amounted to 3 rubles. The highest yields were achieved by the scientists of the Institute of Electric Welding imeni Ye. O. Patton, the Institutes of the Problems of Materials Management, of the Problems of Casting, and of Cybernetics of the UkSSR Academy of Sciences, the VNIIPKneftexhim [All-Union Scientific Research Planning and Design Institute for Petrochemical Production ?], VNIKhimproyekt [All-Union Scientific Research Institute for Chemical Industry Planning ?] and the Institute of Automation. These institutes achieved more than seven rubles gain for one ruble of expenditure.

The work of the scientists and industrialists of the PO [Industrial Associations ?] "Bol'shevik" and "Tochelektropribor", the Plant imeni Lipse and others were awarded the State Prize of the Republic. For the best development in the area of science and technology, the City Council of STS placed into the competition for the prize of the Central Committee of the LKSM [the Lenin Communist Union of Youth] of the Ukraine and of the Ukrainian Council of STS, the work of groups of scientific associates of the All-Union Scientific Research Institute for Analytical Instrument Building of the Kiev NPO [Scientific Professional Association ?] "Analitpribor" on the subject "Development and Industrial Introduction of the Engineering Means for Gas Analysis by Automated Gas Analyzing Systems for Establishments of the National Economy" and the work of groups of associates of the PO of the Plant "Arsenal" imeni V. I. Lenin on the subject "Automated Systems of Control of a Division of Machine Tools with ChPU [Numerically Programmed Controls]". These efforts were carried out within the frameworks of comprehensive special-purpose programs.

The organization of the work of the STS with the use of the special-purpose program method became a new stage in increasing the yield of the work of the scientific and technical community. The leaders of the industrial boards of the STS are members of the gorkom Council for Cooperation on Scientific and Technical Progress. They work on the various commissions of the gorkom and bring in proposals for the conduct of city scientific and technical seminars.

The operative slogan of the organizers and leaders of the local organizations of the STS is "To Inspire Everyone" so as to accustom every participant to creative industrial activity. For this, the industrial STS together with the commissions of the gorkom plan the subjects of seminars on the various directions of the development of science and technology, and they enlist various participants for the fulfillment of the divisions of the comprehensive special-purpose programs. The scientific and technical seminars have become forums for the bringing together of the interests of scientists and industrialists - the place for the exchange of creative concepts.

In only the first half of 1981, on the subject of agreements for collaboration and comprehensive special-purpose programs, 520 seminars, courses, and schools on advanced technology were conducted with the participation of more than 21,000 specialists at the base of the Kiev department of UkrNIINTI [Ukrainian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Research] and the Republic House of Scientific and Technical Propaganda.

The industrial board of STS organized a school of advanced technology at the PO "Kievtorgmash [Kiev Commercial Machinery ?]" which became the initiator of the movement: "For Economy and Thrift". In it, are the leading specialists of all the industrial enterprises of the industry. It was proposed by the propaganda division of the special-purpose program "Kiev Stamping". On the tasks of the comprehensive special-purpose program "Automated Systems for the Control of Fuel, Energy, and Material Resources", the City Council of STS conducted the seminar "The Rational Use of Secondary Energy Resources is an Important Potential for Saving Fuel in the National Economy".

In the course of drawing a wide circle of specialists into work on the mastery of new scientific and technical achievements, summary seminars, reviews, and competitions are conducted for the improvement of equipment and technology, and for the introduction of new ideas into industry. Thus, at the Plant for Machine Tools and Automatic Machines imeni A. M. Gor'kiy, exhibitions were opened of a new tool and also specimens of technological processes for the machining of metals by cutting. Such exhibitions are being given constantly and have been converted into laboratories of advanced technology.

The members of STS participate in the broad extension of the practice of safeguarding socialist obligations in labor collectives, regions, and also in the labor proceedings of contenders. In the summing up of a socialist competition, the City Council of the STS presents the evidence about the participation of its own local organizations in the fulfillment of agreements for creative collaboration.

The participation of the STS in the system of administering scientific and technical progress in Kiev permits accelerating the introduction of urgent scientific and technical results and the distribution of them to other enterprises of other industries. The competitions conducted by the industrial STS are planned in relation to the results of seminars and are devoted to the main questions of the city's special-purpose programs.

Thus, in 1981 for the best works and proposals for the curtailment of the use of hand labor and the elimination of heavy hand labor (in principal and auxiliary production and in auxiliary operations) in the national economy of Kiev, a contest was conducted. The purpose was to widely attract scientific and technical workers, worker-innovators in production, inventors and efficiency experts into urgent participation for the solution of the problems posed by the 26th CPSU Congress about the further elevation of the productivity of labor and curtailment of the proportion of hand labor in industries of the national economy. This is to be done on the basis of comprehensive mechanization and automation of production processes (especially in auxiliary, transportation and storage operations) by active cooperation in the realization of a comprehensive program for the mechanization and automation of hand labor in Kiev in the years 1981-1985.

In connection with the comprehensive special-purpose program "Kiev Metal", in 1981 a contest was held for the best works and proposals for saving metal in the industries of the national economy, and for reducing metal consumption in machinery, tools, equipment and metal structures being designed and produced. Contests are being conducted in such divisions of the "Kiev Metal" program as low-waste technology, increasing the coefficient of the usage of metal, obtaining parts by the method of electroslag casting, improving the laying out and cutting of metal, and the broad application of powder metallurgy.

Systematic, specially directed work is being done on the creation and introduction of energy-saving technologies. Thus, in the years 1980-1981, 83 works were received in the contest. The economic gain from their introduction amounted to 70,000 kW hr of electrical energy and 65,000 G cal of thermal energy. As the result of the contest first prize was awarded for the work: "A Waste Heat Recovery Installation of the Contact Type for Recovering the Heat of Dusty Exhaust Gases from Glass Making Furnaces" by a group of authors from the Scientific Research Institute of Sanitary Equipment for Buildings and Structures.

With a view to all possible cooperation for scientific and technical progress, and for the development and improvement of systems of scientific and technical information, the commission of the Kiev gorkom for increasing the effectiveness of NTI [Scientific and Technical Information] and propaganda on advanced technology, the Kiev department of UkrNIINTI of UkSSR Gosplan together with Kiev city and regional Councils of the STS and the Kiev city Council of VOIR [All-Union Society of Inventors and Efficiency Experts] in 1982 conducted a review for the best formulated work on scientific and technical information, propaganda, and the efficient introduction into production of the achievements of science, engineering, and advanced technology. The leadership of STS and VOIR gave attention to the joint planning work of the services for scientific and technical information and of the STS and VOIR organizations on the use and introduction into production of the achievements of science, engineering, and advanced production technology. A Central Commission and review commissions from the enterprises (organizations) were created to conduct the review and summarize the results.

The commissions of the gorkom, the city Council of the STS, and UkrNIINTI are planning a scientific and technical conference on the period for completion of comprehensive special-purpose programs and on the problems arising from the special-purpose method of planning.

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UKRAINIAN ACADEMICIAN STRESSES IMPORTANCE OF PARTY IN SCIENTIFIC WORK

Kiev RADYANS'KA UKRAYINA in Ukrainian 11 Sep 82 p 2

[An interview with the Vice-President of the Ukrainian Academy of Sciences, Academician AN UkSSR Kostyantyn Mercuriyovych Sytnyk: "The Scientist's Position"; date and place not given]

[Text] [Question] Kostyantyn Mercuriyovych, you have been in science for more than three decades. We know you not only as a scientist who conducts deep and productive research in botany, but also as a scientific organizer in the republic, a public man. Therefore, it would be very interesting to hear your thoughts about the role of science and that of the scientist in our life. If you don't mind, we'll start our interview with this question: What, in your opinion, is the most typical quality of a scientist, our contemporary?

[Answer] In these more than thirty years I have met and worked with very many scientists some of whose names are the pride of both the fatherland and world science. Which of their character qualities could be called typical? First of all probably their drive, their perseverance. Yes, perseverance. Without it it is difficult to achieve notable results in science.

[Question] Forgive me, but perseverance was also characteristic of true scientists in previous times and generations...

[Answer] Of course, but I feel that in our society the expression "scientific perseverance" has acquired new shades of meaning. Our science serves the people faithfully and unselfishly. Our scientists see their calling in serving the Soviet people, the high communist ideals. Their perseverance lies in continuous striving for new findings, ideas, discoveries which would move our science ahead and make our country more beautiful and powerful, in daily strenuous, often hard work directed towards expanding and deepening one or another branch of science.

The Soviet scientist is noted not only for his erudition and scientific competence, but also for a wide political outlook, firm ideological convictions, a deep knowledge of Marxist-Leninist methodology and the ability to apply it creatively in his daily activity. These

are the chief qualities, typical characteristics of a scientist, our contemporary.

[Question] Yes, the scientist's work in our society has high social value, scientific results become truly the wealth and achievement of all people. We speak of science today as a continuous productive force. We have in mind its tremendous applied meaning, full utilization of the achievements of scientific-technical progress in all spheres of social activity. In connection with this, would you not consider the so-called "pure science" out of date? Do you know of instances where individual scientists tried or try to isolate themselves in "ivory towers" under this very label "pure science"?

[Answer] I sense that you have a somewhat ironical approach to the term "pure science". And needlessly. I for one, interpret this term as creative search in theory. Is it needed today? Of course. Without it, as was stressed at the 25th Party Congress, the full stream of scientific-technical progress would be exhausted. Without it, we would not have the successes which we have today in applied science, in the practical utilization of scientific developments. I could cite literally hundreds of examples to confirm the above. As you probably know, in the Tenth Five Year Plan the CC CPSU approved the Ukrainian Academy of Sciences experience on establishing more than 300 technologies of various types and levels which are successfully utilized on enterprises of a number of ministries. All of these technologies are developed on the basis of deep fundamental research conducted at the republic's academic institutions.

Finally, I would like to say the following: I personally have also "isolated" myself. I work on purely theoretic problems. I study the processes of constructing plant cells, the physiology of individual organs. These problems deal with the essence of everything alive on our planet. When and how will the results of my research find their way into practice and bring concrete returns? That is difficult to say. Yet, I am firmly convinced that I and my colleagues from the Institute of Botany imeni M.H. Kholodnyy, AN UkrSSR, and other closely related institutions must continue these searches actively, developing and deepening them.

I therefore repeat, "pure science" or fundamental research is essential. There is nothing more practical than a good theory. Of course, it sometimes happens that gaps develop between theoretical and applied research with barriers that are difficult to overcome. These occurrences should be struggled with decisively.

[Question] You are right. Yet, you must agree that in combatting these gaps and barriers a lot depends on the scientists themselves. At the 26th CPSU Congress it was stressed that "science itself should continuously 'disturb the peace', pointing towards areas which are at a standstill and lagging where the present level of knowledge provides an opportunity to move ahead faster and more successfully."

What effect does this requirement have on the style and management in scientific work?

[Answer] As you know following the above quote from the 26th CPSU Congress Report there is a paragraph in which comrade L.I. Brezhnev names specific addresses of collectives where scientific-research and planning-construction work are closely connected economically and organizationally with production. Among the four addresses is one from Kiev: The Institute of Electric Welding imeni Ye.O. Paton, Ukrainian Academy of Sciences. The Institute's collective is well-known outside the boundaries of our republic and even our whole country. It is difficult to name a branch of economy where elaborations proposed by Paton Institute workers are not used. In addition, each one of them is noted for a high scientific, construction and technological level as well as economy and productivity.

Other sub-divisions of the republic's academy, for example the institutes on problems in materials studies, cybernetics, hard surface materials, physical-technical, low temperatures and general and inorganic chemistry also have interesting experiences in effective administration of creative research and operative transfer of their results into production.

We also have experience in administering scientific-technical progress on a wider scale. Again I will list examples from the republic's Academy of Sciences activities. In recent years it initiated the establishment and development of a whole series of progressive forms of uniting science with production. Among them agreements of cooperation with oblasts in the Ukraine, joint work with ministries on complex scientific research plans and their introduction, scientific-technical programs in the interests of large production associations such as the Moscow "Avtozil", Lvov "Kineskop" and branch laboratories. Each of these forms was time tested and has shown its practical value.

Certainly life is not at a standstill. New goals and further frontiers require continued improvements in the connecting mechanism between science and production, more active and purposeful scientific search in the interests of national economy.

The republican review of scientific achievements introduced into production conducted on the initiative of CC Ukrainian Communist Party testified again to the great opportunities existing in a creative union between work and knowledge. The fulfillment of large scale, complex scientific-technical programs shows the marked reserves in uniting the efforts of scientists and specialists in the interests of national economy.

Now we have a whole system of scientific-technical programs, from union to regional. Participation in them reflects the specific level of research conducted in a given institute.



[Question] Getting ready for this interview I was especially interested to see how individual institutes of the republic's Academy of Sciences were represented in all-union scientific-technical programs. Generally, institute participation in fulfilling all-union programs has expanded if compared to the previous Tenth Five Year Plan. But something was particularly noticeable. Many institutions of the AN UkSSR are not represented in all-union programs at all. I realize that some institutes, especially in social sciences, study areas which are not represented in these programs. But there are not too many of such institutes. How, then, do you explain the disproportional representation of various academy sections, departments and institutes in all-union programs?

[Answer] I think that participation of all academy institutes without exception in all-union level programs could be considered an ideal variant. At present, as you have noted, it is still far off, although there is visible progress in this matter. It is true that sections and departments of AN UkSSR are represented in all-union programs unevenly. This was discussed openly at one meeting of the academy presidium. It was stressed especially that participation in the fulfillment of programs important for the country should be considered a priority objective for each collective. It was also noted that it is never too late to join programs, but specific achievements should have been reached, advance positions in a specific direction of present-day science.

[Question] I think you will agree with me that to achieve a high level of research, attaining advance positions in science, can be done only when there is an atmosphere of kindness, high standards, mutual help and friendliness, honesty and high principles, a strong sense of responsibility of each individual for the matter at hand. You will probably agree also that in creating and supporting this atmosphere a very important role is fulfilled by the scientific collective's party organization. How should the party-political work in a scientific sub-division take into account the specifics of time and the new requirements which life places before science?

[Answer] The party organization is the center of each scientific collective, its conscience, its soul. Therefore, everything of vital interest to and decided by the collective finds a full and wide reflection in the activity of its party organization. The greater and more effective party organization influence on the life of the scientific institution, the better it works, attaining higher goals. There is a direct dependence. Therefore, if science "disturbs the peace" in practice, then in science itself, its separate sub-divisions, party organizations should "disturb the peace" there. They are called, first of all, to establish and support an atmosphere of high collective creativity, assuring unity in word and action. The chief task of each party organization today is to increase the level of party influence on the activity of their collective, on the growth of businesslike, creative public activity

of each member and, first of all, the scientist-communist. Of course, this influence has to be provided with a system and arsenal of strictly party work forms, measures and methods.

As to new requirements in the activities of party organizations in scientific establishments, I would first isolate the task of promoting stronger contacts between collectives within the framework of scientific-technical programs, agreements of cooperation and other creative associations...

[Question] Along with scientific research and concerns related to the practical introduction of new developments into production, many of our scientists are active public workers, propagating widely and popularizing science and scientific-technical achievements. What would you say about this side of their activity?

[Answer] This is an important, honorable, responsible and needed work. Let's take, for example, deputy responsibilities. Dozens of the republic's scientists were elected to the USSR Supreme Soviet, UkSSR Supreme Soviet and to local organs of power. This is a great trust placed in scientists. And each one holds this trust sacred. There are also quite a few responsibilities and tasks assigned to the director of the Physics-Mechanics Institute AN UkSSR, Academician AN UkSSR V.V. Panasyuk. The most honorable of his responsibilities is that of a deputy to the highest power organ in the country. Lvov area people, constituents of the area represented in the USSR Supreme Soviet by V.V. Panasyuk, know well how much effort and energy he puts into justifying this trust. The same could be said about each scientist elected by the people.

The scientist's propaganda and popularization activity cannot be underestimated. The voice of the scientist-teacher may be heard today in the factory shop, in the field and in the student auditorium. According to data from the administration of the republican organization "Znannya" each year more than 2.3 million lectures are read in the Ukraine.

I would also like to point out that our leading scientists participate in propaganda and popularization work. Among the prizes received by Academician P.H. Kostyuk for his multi-faceted scientific and public activity is an Honorary Certificate from the republic's Supreme Soviet Presidium for active participation in ideological and political-educational work. The scientist, who heads an institute, is Academician-Secretary of one of the ANUSSR sections, UkSSR Supreme Soviet deputy, the head of the Ukrainian Society of Physiologists, council member of the International Physiological Sciences Association, editor of a scientific periodical, and with all this finds time to give popular lectures, and be one of the most active propagandists in the party organization of the Institute of Physiology, AN UkSSR. This party task has been fulfilled by the scientist very conscientiously for more than just one year.

[Question] Kostyantyn Merkuriovych, I would like to touch upon one more topic in our talk -- inheritance in science. I think that among the many tasks and responsibilities decided today by our scientists, the preparation and education of a young creative rising generation is one of the primary tasks.

[Answer] The subject you mentioned is very timely and acute. In the fifties and sixties under the influence of the achievements by our mathematicians, physics specialists, biologists, chemists, representatives of other branches of sciences, under the influence of bright achievements in mastering the cosmos, there was an increased interest among young people in exact sciences. Now this interest has markedly decreased. Considerably lower competition for natural sciences departments and technical specializations in our colleges serves as concrete testimony of the above. This is also happening in other countries of the world.

But we know that without continuous change of generations, without the relay of knowledge and experience, the growth of science is impossible. This means that the relay must be assured and supported. How should it be done? The problem is complex and wide. I am firmly convinced, for example, that the beginning should be still in school. Children should be taught to love scientific-technical creativity still in school, they should become familiar with the world of scientific knowledge, research and discovery, with the work character of a contemporary scientist. The education of the rising generation in colleges and also in scientific research institutes should be improved. The main road here is the preparation of scientists through post-graduate work and participation in creative contests.

I would especially like to stress the importance of the personal interest of each scientist in educating an appropriate following. Each true scientist should prepare followers in science who would continue his life's work. The Kiev school of mathematics successes are widely known. This school was started in the twenties. Close to its sources stood the noted mathematician M.M. Krylov. In addition to the large contribution to the mathematics theory, he prepared a number of young scientists who took up the relay of his scientific ideas. Among them was also M.M. Boholyubov today well-known in the scientific world. He, too, had quite a few students and followers. Thanks to this continuation in science a creative relay is assured.

We can see that a talk about our contemporary scientist is wide and varied. We only touched upon some aspects. But even in this we can see that the Soviet scientist lives a multi-faceted and full-blooded life, aspiring continuously to bring higher benefits to his native land, his people and communism establishment. In this he sees his calling and the contents of his life.



## PRODUCTIVE INNOVATIONS OF YOUTH

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 8, Aug 82 pp 53-53

[Article by A. Korolev, deputy chief of the Division of Assimilation, Presidium, BSSR Academy of Sciences: "Youthful Innovators"]

[Text] The process of assimilating the achievements of science and technology into production is not self-actuated or automatic. The process occurs in company with the breaking down of outmoded ideas, relationships, and traditional ways, and with revisions in production. This is an area in which youths, with their energy and dedication, are opening up a broad field of activity.

Young scientists and specialists of the BSSR Academy of Sciences during the past five-year plan forwarded to the USSR State Committee for Inventions and Discoveries 2,500 applications for proposed inventions and received 1,544 authorship certificates and approvals. They introduced almost 150 innovations that resulted in savings of more than 80 million rubles, a figure that is three times higher than the one for the Ninth Five-Year Plan. The work of the young investigators was recognized through the awarding of 90 medals and 100 diplomas at the exhibits of the Science and Technical Creativity of Youth and the USSR and BSSR Exhibitions of the Achievements of the USSR Economy. The scientific innovations, models, and operating apparatus have been successfully exhibited in the German Democratic Republic, Hungarian People's Republic, Czechoslovakian SSR, and the Bulgarian People's Republic. Young members of the academy have published more than 10,000 scientific articles and have presented more than 12,000 lectures on sociopolitical and popular science themes. These facts bear witness to their exceptional creative potential.

Analysis of the problems of assimilation into production shows that the innovations that are used most rapidly are those having a practical value that is easily recognizable not only by scientists but also by members of industry. Nevertheless, the technical refinement of an idea is no firm guarantee of its commercial

success. Practical skills and knowledge of production, therefore, often are more useful during the development of new products than a theoretical grasp of new methods. This means that students must constantly broaden their knowledge of applied science, and of the yet to be solved scientific and technical problems within various sectors of the economy. A worthwhile aid in this matter is the exchange with plant workers of scientific and technical information and work experiences and the scheduling of joint scientific and practical conferences and science days at republic enterprises and in sectoral scientific research institutes. Within the BSSR Academy of Sciences, those conferences are still recalled that were held in the Beloruskaliy production association at Soligorsk, the Borisovskiy plant for motor vehicle and tractor electrical equipment, and the plant for semiconductor power rectifiers in Molodechno. The young members of science and industry have published a series of proceedings that naturally has practical value both for themselves and for others. However, the results of the measures that are introduced will be of minimal significance unless the circle of participants is expanded beyond that of the young scientists themselves. The opinions of leading experts on the national economy, of workers, and of scientists also are very important. The outlook of the youths also must be broadened. They should be sent to the middle-sized cities of the republic in which a powerful industrial potential is currently being developed.

The simplest forms of scientific assistance to industry are consultations with scientists, presentations of lectures to workers, and tours of scientific research facilities that include demonstrations of new developments, apparatus, and machinery. I think that it would be beneficial to the councils of young scientists and specialists from higher education and scientific institutions in the republic to use the experience of their colleagues from the BSSR Academy of Sciences through the publication of subject plans for lectures and the distribution of them to the workers at the larger industrial enterprises. The workers could then invite the lecturers to their plants.

"Today it has been invented--tomorrow it will be verified in practice." This principle should be a prerequisite for all youth collectives. It is not that difficult to achieve when groups that provide assistance, within both institutes and enterprises, are used during the assimilation of an innovation. Their cooperation helps in establishing close contacts within the system of "institute-producer" and "producer-institute," and in assimilating the innovation in strict agreement with certification. Certification is beneficial for each new development. It simplifies control of the assimilation process and permits continuous adjustments for omissions and shortcomings. Also contributing to this control are calendar schedules for komsomol and youth sponsorship, for meetings of youth, and for training in the development or manufacture of equipment. Basic to the carrying out of a complex of measures is an agreement on the creative cooperation between the formations of youth in a scientific facility or an enterprise. This know-how already exists in many institutes within the academy. The agreements make it possible to enter into business-like arrangements with the services that are responsible for the manufacture and assimilation of innovations and for overcoming obstacles that delay progress.

For example, at certain enterprises in the republic up to 40 percent of the raw materials and metals are wasted and technically obsolete items are produced.

This situation cannot contribute to the professional pride of the young scientists working in machinebuilding, studies of materials, and technology. Thus, workers from the Institute for Problems of Reliability and Durability of Machines of the BSSR Academy of Sciences have organized a sponsoring organization over the development of machine building.

Close contact has been made, in particular, with the Gomsel'mash plant, which is now undergoing full-scale reconstruction. The scientists have supported the initiative of the plant worker who said, "Each young designer is to develop a component or part for the new KSK-100 combine." They actively participated in the development of the combine's transmission, in studies of the loading regimes for the machine under field conditions, and in the development of methods for increasing the wear resistance of key parts of the shredding drum.

When speaking of the participation of youth in the assimilation of new developments within an industry, the student-scientist-producer and scientist-producer associations Avtofiztekhn, ANITRO, MAZ-BPI, and MTZ-BPI come quickly to mind. It would be worthwhile if the councils of young scientists of the physico-mathematics and applied sciences departments of the BSSR Academy of Sciences and their primary organizations in the institutes of mathematics, applied cybernetics, problems of reliability and durability of machines, applied physics, and applied technology within the associations would conclude agreements on the creative cooperation with the young specialists of the production associations BelavtoMAZ and of the Minsk Tractor plant imeni V. I. Lenin. Their combined energies would make it easier to define the work more precisely and to avoid formalism in the organization of sponsoring organizations.

This topic was discussed at one of the plenums of the komsomol committee of the BSSR Academy of Sciences, which addressed the activities of the combined collectives of creative youths. Discussion centered on whether to choose plan-related or unplanned tasks as a basis for work, and on what their optimum structure should be. The most effective such combined collective is one comprising plant workers, scientific associates, designers, and workers at pilot production facilities. This, incidentally, conforms to the statute on these collectives, which has already been in effect for three years. The experience of the Integral production technical section is illustrative. About one-fourth of all innovations at this section have been introduced by youth. As a result of the cooperation between the scientists and the designers within the sphere of production, the path from the conception of an idea to its implementation has been reduced one and a half times over.

From among the group of young scientists and specialists at the Institute for Applied Cybernetics of the BSSR Academy of Sciences, as well as among those at the special design and technological bureau with an operational directorate for the introduction of systems for automated planning, a combined collective of 16 persons was formed. The collective assists enterprises in the assimilation of new developments and in the training of cadres. There is plenty of work; in fact, the sponsorship activities among the collective and the enterprises are extensive. They maintain contact not only with the industrial centers of Belorus' and the European part of the USSR, but also with a group of organizations in Siberia, the Far East, Middle Asia, and the Caucasus. Participants in 1980 alone conducted six

thematic schools and seminars, two of which were industrial ones for design organizations of the USSR Ministry of the Machine Tool and Tool Building Industry and for planning organizations of the USSR Ministry of Light Industry. The cost benefits of the assimilation of the innovations of the systems for automated planning in the very same year of 1980 amounted to more than 1.1 million rubles. During the all-union competition for the most creative collective, the collective for systems for automated planning was singled out as a winner and was awarded an advanced banner of the Central Committee of the All-Union Lenin Young Communist League. The banner had earlier been carried on a space flight.

The Stimul combined collective of creative youth was recently created in the Institute of Heat and Mass Exchange. The young scientists and specialists from six laboratories that have joined this collective are solving such basic problems as the fixation of nitrogen from the atmosphere. This work, which it is estimated will take two years (incidentally, it is nonplanned), has received the support of management in the institute. An intersectoral combined collective of creative youth was created in the Pervomaysk area of Minsk to solve several production problems in the Belorusskoye optics and mechanics association.

Analysis of the activities of the existing combined collectives of creative youth indicates that each one has its own unique characteristics. On the one hand, of course, this is worthwhile. But on the other hand, the necessary systematic organization is lacking. It is said that it is very difficult to organize these combined collectives for an extended period of time. It is known that the chain "scientific idea—design decision—test model—industrial prototype—assimilation into production" is in no way a brief cycle. During this time, people within the creative collectives naturally are replaced. Experience has shown that it is worthwhile to take as a base the neighboring links in the aforementioned chain "science—production" and to create a combined collective of creative youth for two or three years duration. Then, after the carrying out of subtasks, the collective is disbanded and a new one is created during a succeeding cycle. Such an organization of work lowers the probability of obstructions during the intermediate stages of the full process of assimilating technical innovations.

Moreover, for this goal laboratories with dual (intrasectorial) subordination to a scientific facility and an enterprise are being created. Is this bicycle really a new invention? As a matter of fact, combined collectives of creative youth laboratories that are based on such structural subunits already exist. For example, a laboratory uniting the young scientists and specialists of the Institute for Problems of Reliability and Durability of Machinery of the BSSR Academy of Sciences with the Minsk motor vehicle plant is concerned with design and technological methods for increasing the service life of tractor engines. A second laboratory of the institute and the Minsk machine tool building production association have enlisted youths to solve problems of increasing the reliability of metal cutting machine tools and the automatic processing of parts for heavy milling and boring machines using digital program control.

It is an exceptionally fitting time to mention the initiative of the council of young scientists and specialists of the Institute of Physics of the BSSR Academy of Sciences in sponsoring the development of instruments, which will be manufactured at the pilot production enterprise being constructed in Minsk.

No matter what the sector of scientific and technical progress, work for the youths generally is in abundant supply. What is most important is that the communication link between the fledgling investigator or designer and the production system be creative and businesslike right from the start.

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## CONFERENCE ON SCIENCE MANAGEMENT AND FORECASTING

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 7, Jul 82 pp 94-96

[Article by Doc Tech Sci A. Korennoy and S. Kalenskaya: "Republic Scientific Conference on Science Management and Scientific and Technical Forecasting"]

[Text] The decisions of the 26th CPSU Congress stipulated that in the 11th Five-Year Plan, the development of science and technology should be directed toward accelerating the transfer of the economy on to a path of intensive development and toward increasing the efficiency of socialist production. This involves the improvement of the organization and administration of scientific research activity and the strengthening of the relationship of science with industry. It also involves the timely definition and changing of the direction of research and development and of the organizational structure of scientific institutions, and the further development of the special-purpose method of planning and administering research and development.

The Republic Scientific Conference on Science Management and Scientific and Technical Forecasting was devoted to these problems. It took place in Kiev on December 1st to 3rd 1981 and was organized by the Institute of Cybernetics of the UkSSR Academy of Sciences, the Ukrainian Council of the NTO [Scientific and Technical Society], and the UkSSR Znaniye [Learning] Society. About 400 scientists from the Soviet Union, Bulgaria, Hungary and the GDR took part in the conference. About 100 speakers addressed the meetings of the sections. Summaries of the reports and communications have been published\*.

The report of D. B. Golovko, secretary of the Kiev city committee of the Ukrainian Communist Party, was devoted to social structures for the administration of comprehensive urban scientific and technical programs. He discussed six comprehensive programs developed in the UkSSR which pooled the resources of more than 300 organizations, many ministries, and departments of the country and the republics, and he explained the new social structures of

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\* Republic Scientific Conference on Science Management and Scientific and Technical Forecasting. Summaries of reports. Parts I, II, III, IV, Kiev, UkrNIIHTI [Ukrainian Scientific Research Institute for Scientific and Technical Information and Technological and Economic Research].

cooperation for scientific and technical progress in Kiev. The report, "Systemic Investigations of the Organizational and Administrative Problems of NTP [Scientific and Technical Progress ?] in the New Economic Conditions" by Doctor of Economic Sciences, Professor G. M. Dobrov of the Institute of Cybernetics of the UkSSR Academy of Sciences, gave a characterization of the problems and potentials of systemic investigations of questions in the organization and administration of scientific and technical activity. The report of Doctor of Economic Sciences, Professor G. A. Lakhtin of the Institute of Economics of the USSR Academy of Sciences was devoted to the development of structures for the administration of research and development. He emphasized the necessity for creating an inter-industry body having sufficient authority to determine program purposes and their achievement. This body should be founded on a matrix scheme of administration. In it, the scientific and technical staff remains within the jurisdiction of the industries, and the use of it in inter-industry operations will be within the jurisdiction of the state committee. Doctor of Economic Sciences V. I. Tereshchenko of the Institute of Cybernetics of the UkSSR Academy of Sciences elucidated the problem of innovation, understood as the birth of new ideas and their realization. The report of Doctor of Technical Sciences A. A. Korennyy of the Institute of Cybernetics of the UkSSR Academy of Sciences considered the basic problems of the automation of information processes in the administration of science. It gave descriptions of automating information systems in the sphere of science, summarized experience in their development and use, and indicated long-term trends for the development of automated information systems particularly for the formation and administration of scientific and technical programs.

A report by Candidate of Economic Sciences V. I. Duzhenkov of the USSR SOPS [Council for the Study of Production Capacities] entitled "Regional Aspects of a Comprehensive Program for Scientific and Technical Progress" discussed a system of measures for improving the disposition of scientific and technical staffs. An analysis of work on the synthesis of comprehensive programs for scientific and technical progress (KPNTTP) and its social consequences and the uses of the obtained results in planning the national economy, permitted formulating more clearly the problems of the allotment of comprehensive programs for scientific and technical progress and the structure and methodological and organizational provisions for carrying out the work. Doctor of Technical Sciences N. K. Moiseyev in a report entitled "Functional Modelling in a System for Increasing the Efficiency of OKR [Experimental Design Work]" considered features of the use of a functional approach to modelling a design process in order to organize it rationally and to determine the advisable limits to automating the procedure. An analysis is carried out of the process of designing a new product with the aid of a typical functional model. The initial information for the construction of such a model is the functional assignment of the stages and procedures of the process of formulating the technical solutions.

At the meeting of the section on "Organizational and Technical Problems of Science and Technology", papers were heard on the results of scientific investigations of organizational and administrative problems in scientific and technical progress, on experience in the formulation and realization

of comprehensive special-purpose scientific and technical programs, on improvement of the structure for regional administration of scientific and technical progress, and on the activities of groups for the development of a methodology and the investigation of the life cycles of technological systems. Candidate of Economic Sciences P. N. Zavlin, in a report entitled "The Effectiveness of the Administration of Scientific Professional Associations", gave his fundamental attention to an element-by-element evaluation of the effectiveness of NPO [Scientific Professional Association] activities. Candidate of Economic Sciences T. I. Shchedrin presented proposals for increasing the effectiveness in the adoption of the output of science. The report entitled "A Special-Purpose Program Approach for Improving Thematic Planning for a Scientific Research Complex" by Candidate of Economic Sciences L. Ya. Koldin was devoted to programs for life cycles. The development of the programs assures a coordinated conduct of operations by executors, associates and contractors in the sphere of science, production, and operation, and it provides for the composition of the long-term plan for increasing the technical level and quality of facilities for industry. The report of Candidate of Economic Sciences V. Ye. Markashov and A. A. Chekmarev touched on the problems of increasing the effectiveness of the activities of educational scientific professional associations, and the report of Candidate of Economic Sciences V. T. Marushak, on the effectiveness of administering the integration of science with industry.

The reports presented to the section "On the Formation and Employment of Scientific and Technical Staffs" considered approaches to problem-oriented evaluations of the standard for providing scientific and technical staff, experience and prospects for its effective employment and prediction, and also the results of investigations of the organizational, economic, informational, and social factors of the efficient activity of scientific groups. (See the reports of A. A. Bogayev, Yu. A. Klochko, A. A. Savel'yevaya, M. P. Chemodanov, G. V. Vinogradov, P. N. Zavlin, M. A. Yudelovich, P. A. Kul'vits, and others.)

At the session of the section "On the Problems of Scientific and Technical Forecasting" reports and communications considered the problems of methodology and practice in scientific and technical forecasting, of raising the quality of long-term and current planning for activities of enterprises, organizations and industries of the national economy on the basis of forecast information. In particular, the reports of Candidate of Physical and Mathematical Sciences I. K. Tsikunov and Candidate of Technical Sciences V. S. Yakovlevaya considered questions of determining the demand for material and technical resources on a forecast schedule.

During the work of the section "On the Provision of Information for the Administration of scientific and technical activity" reports and communications were heard on problems in providing information for scientific research and planning and design operations, and problems in creating automated data systems and systems for the administration of scientific and technical activity, naukometricheskyye [science metrical ?] investigations, and for informational modelling of scientific and technical development. (See the reports and communications of Candidates of Technical Sciences F. A. Krivda and V. A. Kalintsev, Candidate of Economic Sciences V. I. Yanovskiy, and others.)

In the recommendations adopted by the participants at the closing plenary session, the following were emphasized. The need for coordination of investigations on the administration of scientific and technical forecasting, for improvement in the preparation of scientific and technical personnel especially the more highly qualified, for the conduct of basic and applied research on the problems of improving the mechanism for the administration of science including that at a regional level, for improving the organizational and economic structures for the relationship of science with industry, and for improvement in the broadcasting of information about the conduct of the investigations and the results obtained.

It was noted that under the conditions of the stabilization of the numerical composition of the staff for Soviet science and of the regulation, which has been started, of the number working in scientific research, planning, and design organizations, work on the analysis and evaluation of the level of technology of scientific investigations, conducted in close coordination with work on the automation of scientific research and design, acquires special urgency in order to increase the output of existing scientific forces. Activation of this work is one of the important tasks in the area of systemic investigations of the organizational and administrative problems of science and technology.

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## CLOSER TIES BETWEEN SCIENCE AND PRODUCTION CALLED FOR

Moscow SOVETSKAYA ROSSIYA in Russian 4 Aug 82 p 2

[Article by V. Savel'yev: "Delayed Beginning"]

[Text] We are continuing the conversation about the problems of the interaction of science and production. In the previous articles of SOVETSKAYA ROSSIYA on this topic, we were particularly concerned with the ways in which the introduction of scientific developments must be done. One of the theses advanced by the authors of the publications is reduced to the following: recommendations of the scientists must be specific and must have an accurate address. However, it is no less important how the economic leaders use the scientific potential. The proposed article provides the impetus for serious thought in this respect.

The director of the Gryazinskiy cultivator plant, A. I. Sitnikov has reason for a good mood: in the last quarter the collective was in first place in the oblast socialist competition. But the director frowns, it is necessary to master output of a new wide-range cultivator which requires the assimilation of 68 million rubles of capital investments. The significance of this number is apparent in the comparison: the cost of the main funds of the plant is now barely more than R 2 million. Therefore the plant specialists sadly joke: "We will sew it to the buttons of our suits."

The director is not tired of repeating: "We do not do business this way! It is necessary to involve scientific-research organizations and economists-scientists in solving serious problems. Otherwise we will not cope."

The economy of the Lipetsk Oblast has a powerful potential: in the last 15 years the cost of the industrial-production funds increased 4-fold here. However there are also negative aspects of this development. The fund-output is diminishing, and interruption in assignments for the growth in volumes of production and labor productivity are common. Of course, the collectives of the plants, factories, and combines are applying many efforts in order to improve the effectiveness of production. But it is enough to become acquainted with several plans of the organization-technical measures taken at random in order to be convinced that here they have become accustomed to getting along with the in-house forces, there are no attempts for the maximum use of the achievements of science, although the potentialities are there. Namely what?

I will say immediately that the workers of the Lipetsk Oblast have nothing special to wait for from the "plant" science. At 176 of the 249 production associations and enterprises, scientific research and experimental work is generally not done. What is the reason for this? Often others name the following: the plant engineers are involved with solving production tasks and rely a lot on sector science, supporting the business ties with "their own" scientific research, planning-design organizations. This is true, but only partly. At the largest enterprises of the oblast, the Novolipetsk metallurgical, Lipetsk tractor and some other plants, the sector mechanism of control of the economy has really been excellently set up. For example, the metallurgists are successfully cooperating with 70 scientific organizations.

But there are only a few of these plants in the oblast, and there are over 100 in the Gryazinskiy cultivator plant. The subdivisions of the VUZ and sector science on the territory of the oblast could unite the forces of the collectives and begin to work out the problems of regional importance. Unfortunately, the VUZ-sector science has gone far from the "plant" in its degree of influence on production. In the last 10 years, the economic efficiency of work done for industrial enterprises of the oblast has diminished from 5 to 1.7 rubles per ruble of outlay.

What happens? Acting independently, without close contacts with the scientists, the potentialities of intensifying production are practically not used. The scientists, often working in separation from the plant practice for years cannot achieve broad introduction of their developments.

"At the plants, as is known," says the head of the department of economics of the Lipetsk Polytechnical Institute Ye. V. Ostankov, "the research subdivisions are either poorly developed, or are missing altogether, and many enterprises are not capable of attracting scientific workers from the side, there are no resources for these purposes. The VUZ's and scientific research institutes are also not too interested in helping them: they disperse their forces on small objects, this means to make the subject matter smaller and this is impermissible. This is why the efforts of the scientists should be aimed at solving large regional problems, by linking them with specific tasks of labor collectives."

The conclusion is indisputable. But now many plants practically do not have scientific supervision. At the same time efficient forms of integrating science and production have already been found and have been verified! On the initiative of the technical-economic council in the Lipetsk CPSU obkom, the department of the central-chernozem branch of the scientific council of the USSR Academy of Sciences has been created and has already been operating for two years on public principles. It has been entrusted many times with coordinating the development in the region of economic problems of scientific-technical progress. It includes the prominent scientists and specialists of the scientific-research, planning-design organizations, industrial enterprises, VUZ's, and representatives of party and soviet agencies. In the opinion of the chairman of the central-chernozem branch, Doctor of economic sciences, O. G. Turovets, the economic center in Lipetsk is profitably distinguished in its purposefulness from similar ones set up in Kursk, Belgorod and Tambov.

It is thought that the director of the Gryazinskiy cultivator plant A. I. Sitnikov would join the good call. Having heard about the creation of the "local academy," he was the first among the economic leaders of the oblast to knock on the door of science. He came with concern for his unprofitable cultivators. He returned with knowledge about the method of functional-cost analysis. Using this method, at the plant jointly with the scientists he made studies of the design of the cultivator KOR-4.2 which had been lost in production. It was found that with the change in design of individual assemblies and parts, it was possible, without damage to quality, to reduce the net cost by 15-20 percent!

The scientists focus attention of the economists on other acute questions, and proved their solution is quite possible with flexible combination of the sector and territorial interest. For the Lipetsk workers had successfully solved, for the first time in the country, the problem of refining and comprehensive use of blast furnace slags! The slag dumps which occupy a large territory previously were formed in the city. The colleagues of the Lipetsk Polytechnical Institute suggested using the waste of metallurgical production at local enterprises of the construction industry. As a result, without additional capital investments, the existing facilities set up output of inexpensive and high-quality items for construction sites of the oblast. Is this not proof of the potentials of local science?

But let us look into the work plan of the Lipetsk department of the scientific council of the USSR Academy of Sciences for 1982. It would seem that having overcome the difficulties, having accumulated experience, the economists would be seriously concerned about working out problems of scientific-technical progress which are urgent for the oblast. However, the current plan in both volume and essence is inferior to the previous. Some sections have disappeared from it, the number of planned studies for production has been reduced. Why did this overestimation of the valuables occur?

"From the very beginning we have not had illusions," says the scientific secretary of the department, candidate of economic sciences, A. B. Starodumov. "However we believed that the work of the coordination center would interest the public and the production engineers primarily. But we have to admit that reality upset us. Last year only the engineers of two plants came to us, the Yeletskiy "Gidroprivod" and Gryazinskiy cultivator plant. The analytical surveys were also not used in the economic practice."

This is what happens. The plant workers have become so accustomed to doing without science that they have not adopted its current initiative into the calculation. It would seem that for them, the practitioners, the time has not come to master the fine points of economic analysis and they intend to reconstruct the economic mechanism according to the principle "we will begin, then we will see."

Science cannot introduce itself. It is necessary to have a well-proportioned system for introducing scientific achievements, and the primary links of this system must not act in just any place but namely at the plants. The position of the local party, and soviet agencies must become more firm. We do not need discussions about the merging of science with production, but specific measures, concentration of scientific forces, a single scientific-technical policy, and the active support of creativity of the researchers.

This is precisely how the Voronezh workers set up the business. In the association "Elektrosignal" they involved in the research the scientists of the Voronezh VUZ's and developed their system for introducing the new equipment. The initiative was supported by the soviet agencies. The ministry was interested in the experiment, and soon it was dispersed to the entire sector.

In the Lipetsk Oblast, as we see, the production collectives are showing much less interest in cooperating with science. The leading economic teams at times are prone to a formal attitude towards recommendations of the scientists. We will look at yet another plan. It was compiled by the oblast planning commission on the basis, as it says, the technique of the scientific Council of the USSR Academy of Sciences. This document has a list of target programs for the most important problems of the economy and social development of the oblast for 1981-1985. They use the method of program-target planning. But the compilers of the oblast programs follow the path of a man who against the family budget immediately decided to acquire a machine, dacha and to collect works of world literature. They immediately developed 11 programs, but they simplified each to the level of standard plans of organizational-technical measures. As a result, many of them did not move further than the tables of the oblast plan. Is it worth it to be surprised that the economists of the coordination center now have almost been entirely switched to educational work? Now there is a new lecture in their plans, conversations, and participation in conferences.

The director of the Gryazinskiy cultivator plant, A. I. Sitnikov has the project for reconstruction of the enterprise compiled several years ago by the Rostov institute "Giprokombaynprom" in his hands. In the multiple-volume work, the section "System of Controlling Production" occupies one page where there are several general, streamlined phrases. The draft does not tell how to control a plant after a 10-fold increase in the volume of productions where the organizational-economic ties are inevitably drastically complicated. The director thinks: what door should I knock at, what scientific institution should I approach for help?

The plant seeks the support of the scientists. The scientists seek contacts with the plant. These persistent attempts at times are directed into a well-proportioned organizational channel.

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## CLOSER CONTACT OF SCIENCE AND PRODUCTION IN GEOLOGY ADVOCATED

Moscow EKONOMICHESKAYA GAZETA in Russian No 34, Aug 82 p 15

[Article by Yu. Bakulin, general director of the association "Dal'geologiya," Lenin Prize laureate: "What Should the Association Be Like"]

[Excerpts] The preparation for transition to a new plan of control of production consisted of developing a draft for creation and development of the association "Dal'geologiya." At the preparatory stage, the subdivisions for specialization were enlarged, centralized services of preparation and organization of production were formed, and a dispatcher service was introduced. The creation of the association, enlarging of production units made it possible to disperse more widely the watch method of organizing the work of the drilling brigades. With the reduction in the number of administration-managerial personnel by 84 people with a total annual outlay of about R 390,000, all of this resulted in an increase of the volumes of work and a rise in labor productivity. The volumes of mechanical crown drilling, for example, rose by 25 percent, and the drilling rate by 14 percent.

### The Production Engineers Left, The Scientists Appeared

But here it is necessary to mention the following fact. Not all the features of the Far East were reflected in the structure of the association. We will attempt to explain this.

The low degree of geological study obliges conducting of regional-geological surveying and geophysical studies at higher rates. In fact, in the general volume of work (in a monetary expression) it is about 20 percent, but in concentration of the engineering-technical cadres it is even in the first place, involving an average of 28 percent of the total number. In the research essence and originality of the obtained results, the regional work in this case is close to the scientific research.

The association annually conducts scientific-research, so-called thematic work for a total of about R 700,000 per year. In addition, the experimental-method, technological, geological-economic studies for the production plan are another approximately R 600,000 per year. The range of this research reflects the most urgent tasks set on the agenda by the needs of production.

At the same time in parallel to the association there is an active sector institute of the USSR Ministry of Geology in the city, the Far East Institute of Mineral Raw Materials.

With the formation of the association, we appealed to the USSR Ministry of Geology to include the institute in the association. Unfortunately, the ministry considers this measure premature. The result? Instead of a direct economic effect of this measure, we were forced to create in the association a thematic expedition which results in surplus outlays, and in particular wasteful under conditions of a shortage of personnel.

The tasks of improving the effectiveness of scientific research cannot be solved without searching for new forms of cooperation between scientific and production subdivisions. For the regions of Siberia and Far East, the search for organizational unity in sector science and geological-exploration industry is the most urgent. At high rates of economic development here, it is necessary to combine to the maximum the time of geological study to the depths and scientific, primarily geological-economic development.

#### On Public Principles

It is thought that in this case one should make the most efficient approach to the formation of the production-technical, laboratory and experimental base, by creating single enlarged and well-equipped sector "economies," and not to show a narrow departmental approach.

Our search is for the closest contact with academic science resulting in the birth on the initiative of Academician Yu. Kosygin of such a form of scientific-production cooperation as participation on public principles of the geologist-production engineer in scientific developments, and the scientists in solving practical tasks. Thus, the chief geologist of the gravimetric party, Candidate of sciences E. Reynlib at the scientific council of the Institute of Tectonics and Geophysics was received by the senior scientific colleague on public principles.

The source of financing can probably be: capital investments for the preparation of geological facilities (some sector, for example, the gold extracting industry or construction industry).

With the existing system of calculating the activity of geological organization for fulfillment of the plan for increase in explored reserves, work which compiled up to 40-60 percent of the total outlays and which includes such important minerals for the development of the industry and agriculture as underground water, and different construction materials now are outside the analysis. The national economic effect of using these minerals is often commensurate, and sometimes exceeds those prestigious forms of raw material like coal, gold, tin and others.

Measurement of the results of the work of the geologists through such a generalizing indicator as the preparation of geological facilities in a cost expression of annual product will make it possible to eliminate disproportions in the development of the work for all types of minerals.

I will present an example. At the Tudurskiy field of gabbrodiorites, a large stone field suitable for all possible needs was explored. At the Bochinskiy field of aleurolites for production of claydite gravel, geological facilities were prepared for R 13.1 million per year. At the Chagoyanskiy field of limestones, production of limestone powder for agriculture and gravel for construction limestone is planned. These three fields alone yield a product of R 46 million per year. This already a solid extracting enterprise.

This is why we are for the introduction of a generalizing indicator for evaluating the activity of the geological organization.

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## NEW HIGH TEMPERATURE POLYMER ROLIVSAN DEVELOPED IN LENINGRAD

Leningrad LENINGRADSKAYA PRAVDA in Russian 12 Sep 82 p 1

[Article by Zh. Manilova: "A Formula for Creativity: How Pledges are being Fulfilled" under the rubric "60th Anniversary of the USSR"]

[Text] Now that the industrial technology for the production of the new material developed by Leningrad chemists is being worked out at full speed, the institute is receiving an increasing number of letters. B. A. Zaytseva picks up from her desk a thick pile of letters and opens at random one of them: "To M. M. Kotov, Director of the Institute of High Molecular Compounds, USSR Academy of Sciences, Corresponding Member, USSR Academy of Sciences."

...[The polymer] Rolivsan is of particular interest to the synthesis of new impregnating compounds for tractive electric motors with longer operating life. These motors will be used in locomotives on the railroad trunk lines of the USSR and especially on the Baykal-Amur Railroad. The use of the new electrical insulation polymers with their extra resistance to high temperatures as well as high mechanical strength, such as are displayed by Rolivsan, will serve to markedly expand the traffic capacity of the railroads and prolong the inter-repair operating periods of locomotives. The savings to the national economy from the use of the new polymer in the manufacture of electric traction motor series will reach 2.4 million rubles a year.

Even greater savings, according to a letter from experts at the Institute for Simulation Problems in Power Industry, USSR Academy of Sciences, can be achieved by using Rolivsan in the design of optico-mechanical memory devices. In their opinion, the new polymer could save 121 million rubles annually in their subsector alone.

What is then that material which is so highly promising to the national economy and which has aroused interest among people dealing with the most varied types of production? This concerns a fundamentally new class of polymers designated by the acronym r (reactive) ol (oligomers) ivs (Institut Vysokomolekulyarnykh Soyedineniy [Institute of High-Molecular Compounds]) an (akademiya nauk SSSR [USSR Academy of Sciences]).

The most important properties of Rolivsan are its resistance to high temperatures and aggressive chemical environments and its mechanical strength. It also is no less important that this new polymer does not require solvents--which as a rule are highly toxic--for its production. And lastly, this polymer has an extraordinarily broad range of applications. Rolivsans may be used as electrical insulating materials, high-temperature adhesives and coatings, sealants, and in the form of composite materials.



is, the Minsk Automobile Works. The task is to include other plants of the association as well in the orbit of cooperation between production men and scientists. The academic institutes as well as the technical services of the "BelavtoMAZ" should cooperate more actively to reduce the material-intensiveness of production, develop energy-saving technological processes and automate production.

Special mention should be made of the work of the scientific-production association for powder metallurgy. Even now the savings ensuing from the introduction of projects by the scientists of that association exceed 10 million rubles annually.

Let me also mention yet another qualitatively new inter-subsector association. This concerns the republic scientific-technical center for hardening technologies, set up as a public service under the BSSR Academy of Sciences. It consists of a number of leading academic institutes, the association of powder metallurgy, large machine-building enterprises and design and technology agencies.

The practical application of the achievements of scientific and technical progress is a task no less topical than their accomplishment. In 1980 the city's enterprises introduced 736 measures which had yielded savings of 67 million rubles. Last year these figures increased, but the potential in this respect is still tremendous.

We have arrived at the conclusion that it is necessary to establish a special agency dealing primarily with aspects of the introduction of innovations and coordinating the pertinent efforts of the city's scientific organizations and enterprises of industry, construction and transport. Attached to the city party committee is the council for the introduction of achievements of scientific and technical progress into production. This council consists of responsible members of the city and rayon party committees, scientists, managers and chief experts at large enterprises. The main task of the council is to improve the coordination of applied scientific research with allowance for the needs of production and expedite the application of scientific and technological developments at the city's enterprises.

At the same time, it should be said that the path toward enhancing the economic effects of the applied joint projects of scientists and production people is still bestrewn with many difficulties and major problems whose resolution does not depend on us alone. The time is past when problems of improving production used to be solved within the confines of any single subsector alone.

Were, we have the right to expect more active cooperation from the academic institutes. We expect from the BSSR Academy of Sciences a broader development of such a form of ties between science and production as integrated brigades consisting of scientists from academic establishments and experts from subsector institutes and industrial enterprises. Such brigades would be capable of handling in an extremely competent and coordinated manner the entire cycle of a project starting with laboratory experiments and ending with the introduction of the findings into practical production.

Currently the city party organization attaches particularly great importance to implementing the tasks posed by the May (1982) Plenum of the CPSU Central Committee regarding the Food Program. At the plenum of the city party committee it was pointed out that the most immediate task of the city party organization consists in multiplying, as soon as within the present year, the contribution to strengthening the material-

technical facilities of agriculture and developing the agroindustrial complex, as well as increasing the production of food resources and utilizing them economically. Science is called upon to play an important role in fulfilling this task. The city contains more than 30 research and technological design institutes and design bureaus as well as a number of institutes of the BSSR Academy of Sciences that work on agricultural topics.

Practically all the higher schools in the city are training engineers, teachers, physicians and social and cultural workers for the countryside. These collectives will make a major contribution to the further upsurge in agricultural production as well as to improvements in the systems of intensive farming and animal husbandry and the introduction of progressive forms of the organization of labor. Thus, scientists of the BSSR Academy of Sciences have obtained important results in developing new high-yielding varieties of grain, fodder and commercial crops, increasing the reliability and durability of agricultural machinery and using laser technology for selection work. A large volume of assignments for agricultural machine-building enterprises is being carried out by scientists at the polytechnical institute where roughly every fifth or sixth scientific or technical project is directly related to the implementation of tasks contributing to the intensification of agricultural production.

However, as noted at the plenum of the city party committee, the scientific potential and creative capabilities of a number of scientific research institutes and higher educational institutions are not yet being adequately utilized. In the light of the requirements of the May Plenum of the CPSU Central Committee, these institutions were posed the task of working out a clear research strategy and ascertaining that agricultural topics would not play a secondary role in their research plans and should be closely related to the major directions of the intensification of agriculture.

In Minsk there exists a scientific-production association for the industrial processing of potatoes which is subordinated to the USSR Ministry of the Fruit and Vegetable Industry. The association is directed by A. Mazur and it has existed for nearly 10 years now--quite a long time. But although this association operates its own scientific research institute, during the long period of its existence it still has not been able to develop even one major project that could find broad application in the subsector and appreciably affect its technological level. It is precisely this association that should expedite the development of new types of food products. The abovementioned association has been subjected to just criticism in the article "Draniki. What Happened To Them?" published in IZVESTIYA.

Other problems and shortcomings in the performance of the subsector organizations and establishments also have been uncovered. The research topics handled by the subsector scientific research institutes continue to contain a low proportion of topics linked to the solution of the principal Union- and republic-wide national economic problems, and at some scientific establishments research topics often are divorced from practical questions and the needs of the economy of the republic and the city. The completed scientific and technical projects include few performed at a technical level surpassing the best world and domestic analogues. A large number of patent claims has to be rejected owing to lack of originality. The periods of the design and development of new products at the city's subsector scientific research institutes are unjustifiably long.

The Department of High-Temperature Polymers, headed by Mikhail Mikhaylovich Koton Director of the Institute of High-Molecular Compounds, deals with extremely topical problems, as its very name shows. The development of aviation and space technology and the complex problems being solved by the electrical and radio engineering and electronics industries require of chemists that they develop increasingly stronger materials capable of withstanding high temperatures. And such materials have, of course, been developed by, among others, the Institute's scientists. However, this being the main point of the present tale, the chemistry of high-molecular compounds is governed by a law which constantly "shuffles the cards" of the researcher. The greater the high-temperature resistance that scientists wish to achieve in a polymer, the more intricate and hence also the more expensive its manufacturing technology becomes. This law is substantiated by fundamental considerations of theory, and it is extremely difficult to break this vicious circle.

Such a breakout could not either be accomplished by the team of Boris Aleksandrovich Zaytsev, which has been working on oligomers within the department. Then the researchers hit upon a roundabout solution. Paradoxically enough, they resorted to a long-known low-cost oligomer technology normally used to synthesize polymers lacking high-temperature strength.

The point is that high-temperature strength is induced in polymers with the aid of particularly rigid so-called cyclical structures which are introduced at the very beginning of the technological process and, as pointed out above, complicate it. The researchers decided to discard this traditional approach. In lieu of substances with rigid structure they used flexible substances having the capability of subsequently acquiring high-temperature strength.

Such is the seeming simplicity of this novel idea. But it is only seeming, because the development of the new material involved extensive difficulties that had to be overcome at the cost of considerable effort and time. Without going into details, let us say that the researchers had to carry out, for example, a large number of chemical transformations, especially synthesize low-melting substances with a special structure, etc.

One more important factor: The scientists belonging to B. A. Zaytsev's team would hardly have been able to produce such outstanding results without assistance from the associates of other laboratories. Thus, the collective of the Laboratory of Analytic Chemistry under the guidance of Doctor of Chemical Sciences B. G. Belen'kiy, carried out a number of analyses with the aid of highly effective chromatographic techniques.

The circumstance that physicists are working side by side with chemists within the Institute turned out to be extraordinarily valuable. The new methods for the analysis of the structure and properties of polymers that were developed by the physicists proved to be simply indispensable to the synthesis of Rolivsan. There was particularly close collaboration between the chemists and the laboratories of polymer mechanics and thermal analysis, the laboratory of strength problems, and others.

The socialist pledges of the collective of the Institute of High-Molecular Compounds for 1982 include one that enumerates in detail the studies that have yet to be carried

out in order to expedite the development of a manufacturing technology for Rolivsan. At this extremely important stage of work the Leningrad experts closely collaborate with the collective of the Ukrainian Affiliate of the Scientific Research Institute of Semifinished Organic Products and Dyestuffs. It is not accidental that recently both B. A. Zaytsev himself and a member of his team, G. I. Khramova, as well as other scientists increasingly often make official trips to the city of Rubezhnoye in Voroshilovgrad Oblast, for this is where is being done most of the work on whose speediest completion hinges the commencement of the mass production of the new polymer.

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CSO: 1814/22



### 36 WORKS SUBMITTED TO UKRAINIAN COMMITTEE FOR S&T PRIZES

Kiev PRAVDA UKRAINY in Russian 14 Jul 82 p 3

[Text] The UkSSR Committee for State Prizes in the area of science and technology affiliated with the UkSSR Council of Ministers reports that the following works have been accepted for participation in competition for State prizes of the Ukrainian SSR for 1982 in the area of science and technology:

I.

1. GIKHMAN Iosif Il'ich, SKOROKHOD Anatoliy Vladimirovich, Monograph "Theory of Random Processes" (in three volumes).

Presented by the Institute of Mathematics, UkSSR Academy of Sciences.

2. BOGOMOLOV Sergey Ivanovich, BURLAKOV Anatoliy Vasil'yevich, VOROB'YEV Yuriy Sergeyevich, GOLOSKOKOV Yevgeniy Grigor'yevich, ZARUBIN Leonid Aleksandrovich, KANTOR Boris Yakovlevich, PODGORNYY Anatoliy Nikolayevich, RYZHKOV Viktor Kuz'mich, UGOL'NIKOV Viktor Vasil'yevich, FILIPPOV Anatoliy Petrovich, A series of papers in the field of strength of power-producing machines and introducing them into turbine building practice.

Presented by the Institute of Problems of Machine Building, UkSSR Academy of Sciences.

3. ISAKHANOV Georgiy Vakhtangovich, BAZHENOV Viktor Andreyevich, BERYUZHSKIY Yuriy Vasil'yevich, GULYAYEV Valeriy Ivanovich, DEKHTYARYUK Yevgeniy Semenovich, ZAVYALOV Gennadiy Georgiyevich, KISLOOKIY Vladimir Nikitovich, ROYTFARB Iosif Zel'manovich, SAKHAROV Aleksandr Sergeyevich, SINYAVSKIY Aleksandr Leonidovich, A series of articles "Investigation of Processes of Deformation of Three-Dimensional Structures Based on Theory, Methods of Numerical Analysis and 'Prochnost' Software".

Presented by Kiev Engineering Construction Institute.

4. FEDOROV Yevgeniy Pavlovich, YATSKIV Yaroslav Stepanovich, GAVRILOV Igor' Vladimirovich, DUMA Dmitriy Pavlovich, KISLYUK Vitaliy Stepanovich, KORSUN' Alla Alekseyevna, KUR'YANOVA Antonina Nikitichna, A series of papers "Development of Theory and Practical Construction of Coordinate Systems for Geodynamic, Selenodetic and Space Research".

Presented by the Main Astronomical Observatory, UkSSR Academy of Sciences

5. DVORNIK Stanislav Grigor'yevich, DOLGONOSOV Naum Semenovich, DOSENKO Anatoliy Donatovich, IOVENKO Oleg Viktorovich, KRASNOSHTAN Nikolay Nikolayevich, PETLENKO Yuriy Aleksandrovich, PUKHOV Georgiy Yevgen'yevich, SKLYAROV Vitaliy Fedorovich, TSIPTSYURA Rostislav Dmitriyevich, CHACHKO Aleksey Grigor'yevich, "Development of Theoretical Principles, Creation and Assimilation of a Complex of Trainers for Preparing and Instructing Operators of Power Generating Units in Fossil-Fuel Electric Plants".

Presented by Kiev Institute of Automation imeni the Twenty-Fifth CPSU Congress.

6. KRAVETS Nikolay Mikhaylovich, MITROFANOV Mikhail Timofeyevich, KULENKO Yuriy Viktorovich, OVCHINNIKOV Gennadiy Mikhaylovich, APENKO Vladimir Panfilovich, TSINMAN Leonid Iz'yanovich, IVANENKO Igor' Borisovich, SIDOR Markiy Vasil'yevich, ANTONYAK Yevgeniy Yevstafiyevich, "Development, Manufacture and Industrial Introduction of Friction Parts in Automated Batching Systems, and Management of the Technological Process".

Presented by Belotserkovskiy Production Association of Tires and Rubber-Asbestos Items imeni the Twenty-Fifth CPSU Congress.

7. TREFILOV Viktor Ivanovich, TIKHINSKIY Gennadiy Filippovich, GINDIN Iosif Abramovich, PAPIROV Igor' Isakovich, GOGULYA Vasil'y Fedorovich, KORNIYENKO Leonid Antonovich, MISYUTIN Anatoliy Yegorovich, TARANENKO Igor' Aleksandrovich, TKACHENKO Vladimir Grigor'yevich, KOLESNIK Leonid Ivanovich, A series of articles "Solution of the Physical Problem of Producing Ductile and Super-ductile Beryllium".

Presented by Kharkov Physicotechnical Institute, UkSSR Academy of Sciences.

8. BELETSKIY Yuriy Ivanovich, BURYAK Valentin Profir'yevich, GALKIN Aleksandr Aleksandrovich, LAZAREV Boris Georgiyevich, LAZAREVA Liba Shmutilovna, MATROSOV Nikolay Ivanovich, PAN Vladimir Mikhaylovich, POLTAVETS Vitaliy Artemovich, AZHAZHA Vladimir Mikhaylovich, CHERNYI Oleg Vladimirovich, "Development and Investigation of Superconductors With High Critical Parameters".

Presented by Donetsk Physicotechnical Institute, UkSSR Academy of Sciences and Institute of Metal Physics, UkSSR Academy of Sciences.

9. ALEKSEYEV Vladimir Alekseyevich, GURSKIY Zinovi Aleksandrovich, IL'INSKIY Aleksandr Georgiyevich, KUZ'MENKO Petr Pavlovich, LYSOV Vladimir Ivanovich, ROMANOVA Aleksandra Vasil'yevna, FEDOROV Valentin Yevgen'yevich, KHAR'KOV Yevgeniy Iosifovich, A series of papers "Experimental and Theoretical Research on Physics of Liquid Metals".

Presented by Kiev State University imeni T. G. Shevchenko.

10. YEREMENKO Viktor Valentinovich, BELYAYEVA Alla Ivanovna, LITVINENKO, Yuriy Grigor'yevich, MATYUSHKIN Eduard Vasil'yevich, NOVIKOV Viktor Pavlovich, SHAPIRO Valeriy Viktorovich, POPKOV Yuriy Andronovich, PETROV El'mar

Grigor'yevich, KHARKYANEN Valeriy Nikolayevich, A series of articles "Exciton and Exciton-Magnon Phenomena in Antiferromagnetics".

Presented by Physicotechnical Institute of Low Temperatures, UkSSR Academy of Sciences, Institute of Theoretical Physics, UkSSR Academy of Sciences and Kharkov State University imeni A. M. Gor'kiy.

11. LIPATOVA Tat'yana Esperovna, PKHAKADZE Georgiy Aleksandrovich, CHUPRINA Lidiya Nikitichna, VESELOVSKIY Roman Aleksandrovich, GORBENKO Rozaliya Viktorovna, SHALIMOV Sergey Aleksandrovich, SITKOVSKIY Nikolay Borisovich, KOLOMIYTSEV Andrey Konstantinovich, DAN'SHIN Timur Ivanovich, YATSENKO Valentin Porfir'yevich, "Theoretical Development of New Biodegradable Polymers of Medical Type, Their Experimental Verification, Creation of Production Technology and Introduction Into Clinical Practice".

Presented by Institute of Organic Chemistry, UkSSR Academy of Sciences.

12. LITVINENKO Leonid Mikhaylovich, MASLOSH Vladimir Zinov'yevich, GONCHAROVA Yelena Mikhaylovna, VLASOVA Nelli Mikhaylovna, MAKUKHINA Vera Timofeyevna, POPENKO Galina Vasil'yevna, POPOV Anatoliy Fedorovich, ALEKSEYEV Vasilii Ivanovich, BONDAR' Yuriy Rodionovich, VOROBYAY Ivan Petrovich, "Development and Introduction of Structurally Dyed and Water Soluble Resins".

Presented by Institute of Physical and Organic Chemistry and Coal Chemistry, UkSSR Academy of Sciences.

13. OGENKO Vladimir Mikhaylovich, PAVLOV Vyacheslav Valentinovich, PAVLIK Galina Yevgen'yeva, TARASEVICH Yuriy Stepanovich, FESENKO Aleksandr Vasil'yevich, KHOMA Mikhail Ivanovich, SHCHERBATYUK Ivan Dmitriyevich, MEL'NICHUK Veniamin Kupriyanovich, TOKUNOV Vladimir Ivanovich, KHEYFETS Iosif Borukhovich, "Development of a New Class of Reagents for the Petroleum and Gas Extracting Industry, Organization of Their Production and Extensive Introduction".

Presented by Institute of Physical Chemistry imeni L. V. Pisarzhevskiy, UkSSR Academy of Sciences.

14. MORGUN Vladimir Vasil'yevich, SHKVARNIKOV Petr Kliment'yevich, PERESYPKIN Vladimir Fedorovich, CHUCHMIY Ivan Petrovich, BOREYKO Vasilii Sidorovich, "Development of Methods for Experimental Production and Practical Use of Induced Mutations in Plants".

Presented by Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences.

15. GRODZINSKIY Dmitriy Mikhaylovich, BULAKH Anatoliy Andreyevich, KAUSHANSKIY David Aronovich, GROMAKOVSKIY Igor' Konstantinovich, ZEMSHMAN Abram Yakovlevich, BOLGAROV Konstantin Pavlovich, MISHURENKO Aleksandr Gerasimovich, "Theoretical Basis, Development and Introduction of Radiation-Biological Technology in Graft Viniculture".

Presented by Institute of Physiology of Plants, UkSSR Academy of Sciences.

16. ALYMOVA Aleksandr Nikolayevich, GULYUK Galina Ivanovna, KAL'CHENKO Vladimir Nikiforovich, KOROLEVA Margarita Aleksandrovna, MARINICH Aleksandr Mefod'yevich, PALAMARCHUK Maksim Martynovich, ZOLOVSKIY Andrey Petrovich, KHARCHENKO Andrey Semenovich, SHCHERBAN' Mikha'il Il'ich, "Atlas of Natural Conditions and Natural Resources of the Ukrainian SSR", published in 1978.

Presented by the Council on Investigation of Production Forces of the Ukrainian SSR, UkSSR Academy of Sciences.

17. KOSOLAPOV Viktor Vasil'yevich, A series of papers "Procedural Problems of Social Perception".

Presented by Institute of Social and Economic Problems of Foreign Nations, UkSSR Academy of Sciences.

18. SHINKARUK Vladimir Ilarionovich, BULATOV Mikhail Aleksandrovich, IVANOV Vadim Petrovich, TABACHKOVSKIY Vitaliy Georgiyevich, YATSENKO Aleksandr Ivanovich, A series of articles "Philosophical Problems of Materialistic Dialectics and Category Structure of Scientific Philosophy".

Presented by Institute of Philosophy, UkSSR Academy of Sciences.

19. MIRONOV Boris Aleksandrovich, KOZACHOK Boris Dmitriyevich, OREKHOV Arseniy Petrovich, BARANOVSKIY Pavel Petrovich, ARKHIPOV Gennadiy Matveyevich, STRIY Ivan Fedorovich, TUDEL' Nikolay Vasil'yevich, POYEDINOK Viktor Yefimovich, KIFORENKO Vasiliy Ivanovich, "Creation and Introduction of the PPK-4 Machine for Highly Efficient Harvesting of the Entire Biological Yield of Maize in a Single Pass".

Presented by the production association "Kherson Combine Plant imeni G. I. Petrovskiy".

20. ZVOUCHIK Vasiliy Grigor'yevich, KASSICH Yuriy Yakovlevich, NECHVAL' Ivan Timofeyevich, KUKSOV Vasiliy Pavlovich, DUBININ Yuriy Petrovich, SHERYREV Nikolay Stefanovich, GRINEV Aleksandr Aleksandrovich, LESHCHENKO Leonid Terent'yevich, YASHKOV Yevgeniy Andreyevich, "Development and Veterinary Introduction of New and Effective Methods and Means of Mass Diagnostic Examinations of Animals for Tuberculosis".

Presented by the Ukrainian Scientific Research Veterinary Institute and Ukrainian Scientific Research Institute for Experimental Veterinary Medicine.

21. BRATUS' Vasiliy Dmitriyevich, VARTANYAN Ogan'es Viktorovich, LAZARETNIK Avram Shimonovich, OCHERED'KO Nikolay Artemovich, PEREKHRESTENKO Petr Mikhaylovich, POVSTYANOY Nikolay Yefimovich, POLISHCHUK Semen Arkad'yevich, SMORSHCHOK Sergey Andreyevich, FEDOROVSKIY Aleksey Aleksandrovich, A series of articles "Development of Pathogenesis of Burn Trauma, Diagnosis, Treatment, System of Organization, Assistance and Rehabilitation of Burn Patients in the Ukrainian SSR".



Presented by Kiev Scientific Research Institute of Hematology and Blood Transfusion.

22. KOMISARENKO Vasily Pavlovich, SHEVCHENKO Aleksandr Vasil'yevich, LUSENKO Valentina Sergeyevna, MAYEVSKAYA Irina Petrovna, GASANOV Saydun Gamzatovich, MITROKHINA Nina Mikhaylovna, KIS'KO Tat'yana Andreyevna, SIROTA Ol'ga Yefremona, "Development of a Method of Producing 'Splenin' Medication, Organizing its Industrial Production, Experimental and Clinical Investigation of the Mechanism of Action and Extensive Introduction Into Public Health Practice".

Presented by Kiev Scientific Research Institute of Endocrinology and Metabolism.

23. MARMUR Rostislav Konstantinovich, TSOK Rozaliya Mikhaylovna, A series of scientific studies on development of effective methods of ultrasonic therapy and diagnosis of diseases of the eye, and their extensive introduction into public health practice.

Presented by Odessa Scientific Research Institute of Eye Diseases and Tissue Therapy imeni Academician V. P. Filatov.

24. BONDARENKO Vladimir Petrovich, GRUMENT Petr Grigor'yevich, DEREVYAYKO Viktor Nikolayevich, ZAMETAYLO Vladimir Vasil'yevich, KOVALENKO Vladimir Sergeyevich, KRIZHANOVSKIY Nikolay Nikolayevich, MUKHA Ivan Markovich, MEL'NIK Vitaliy Ivanovich, RYBITSKIY Vyacheslav Antonovich, STARODUB Nikolay Pavlovich, "Development and Introduction of New High-Efficiency Technological Processes, Equipment and Materials in Tool Production That Have Appreciably Increased Labor Productivity and the Quality of Goods in Kiev Production Association imeni S. P. Korolev".

Presented by Kiev Production Association imeni S. P. Korolev.

25. YATSYUK Arseniy Ivanovich, YAKUBOVSKIY Al'fred Vatslavovich, GUSTI Yemel'yan Yanoshevich, SOROKA Boris Dmitriyevich, MANYUKH Yaroslav Nikolayevich, BIDNIK Stepan Filippovich, "Development and Industrial Introduction of Abrasive Tools and Equipment for Machining Wood, Presswood and Other Materials".

Presented by L'vov Institute of Wood Technology.

26. ROSOSHINSKIY Aleksey Anatol'yevich, KISLITSYN Viktor Mikhaylovich, MUSIN Aleksandr Georgiyevich, LEBIGA Vsevolod Avksent'yevich, SHEVCHENKO Vasily Petrovich, DOBROVOL'SKIY Valentin Nikolayevich, PAVLYUK Sergey Pavlovich, AL'PEROVICH Yevgeniy Aleksandrovich, UTROBIN Yuriy Borisovich, AROSEV Askol'd Avivovich, "Development of a New Method and Assimilation of Highly Productive Industrial Technology for Welding and Soldering Extensively Used Semiconductor Diodes".

Presented by Institute of Electric Welding imeni Ye. O. Paton, UkSSR Academy of Sciences.

27. ZAGREBEL'NYY Aleksandr Ayzikovich, LAPCHINSKIY Vsevolod Feodos'yevich, STESIN Viktor Vladimirovich, SHULIM Viktor Fedorovich, ZHUKOV Gennadiy

Viktorovich, NIKITSKIY Vladimir Petrovich, RYUMIN Valeriy Viktorovich, KISELEV Sergey Aleksandrovich, LYAKHOV Vladimir Afanas'yevich, YURCHENKO Nikolay Nikolayevich, "Development of Equipment and Technology for Applying Coatings Under the Conditions of Outer Space by a Method of Vaporization and Condensation".

Presented by Institute of Electric Welding imeni Ye. O. Paton, UkSSR Academy of Sciences.

28. RYABCHIIY Mikhail Yevmenovich, PUDIKOV Dmitriy Vsevolodovich, GONCHAROV Yuriy Grigor'yevich, KLIMKOVSKIY Bronislav Mecheslavovich, MARTYNENKO Vladimir Petrovich, KABANOV Aleksey Vasil'yevich, STANILOVSKIY Boris Vasil'yevich, KREMENCHUGSKIY Aleksandr L'vovich, KULIKOV Igor' Vyacheslavovich, KARPENKO Viktor Fedorovich, "Development of Industrial Automatic Facility and Technology for Mass Producing Cast Iron Grinders".

Presented by the Ministry of Ferrous Metallurgy of the Ukrainian SSR.

29. POTURAYEV Valentin Nikitich, ABRAMOV Fedor Alekseyevich, ZORIN Andrey Nikitich, ZABEGAYLO Vladimir Yefimovich, BOL'SHINSKIY Matvey Iosifovich, PETUKHOV Ignat Makarovich, MIKOLIN Viktor Ignat'yevich, GAYNUTDINOV Ivan Akzamovich, STUDENKOV Lev Alekseyevich, "Creation of Theoretical Principles, Development and Introduction of a Complex of Effective Methods of Predicting the State of Mines and Carrying out Mining Work in Accordance With Stresses of Gas-Saturated Rocks in Deep Shafts".

Presented by Institute of Geotechnical Mechanics, UkSSR Academy of Sciences.

30. AVDEYEV Genrikh Alekseyevich, ANISHCHENKO Alla Mikhaylovna, BEDNARSKIY Boris Arkad'yevich, GIL'MAN Genrikh Borisovich, DMITRIYEV Leonid Georgiyevich, ZAVAROV Aleksey Ivanovich, KASILOV Aleksandr Vasil'yevich, SHTOL'KO Valentin Grigor'yevich, PONOMARENKO Vasiliy Akimovich, SHAMKO Aleksandr Iosifovich, "Research, Development and Introduction of Suspended Ceilings of Industrial Buildings and Structures of the Ukrainian SSR".

Presented by the Zonal Scientific Research and Design Institute of Standard and Experimental Planning of Housing and Public Buildings, and by Kiyevgorstroy Trust No 6.

31. SIROTENKO Vadim Anatol'yevich, ZARUBIN Fedor Fedorovich, ZINGER Nikolay Mikhaylovich, KRAYEV Igor' Olegovich, KUL'BACHENKO Boris Yakovlevich, ORBEVKO Vladimir Vladimirovich, PUSTOVAROV Yuriy Yemel'yanovich, SAZONOV Rostislav Petrovich, TARADAY Aleksandr Mikhaylovich, "Development, Investigation and Introduction in the City of Kharkov of a Progressive Method of Controlling Internal Corrosion of Pipelines in the Centralized Hot Water Supply, Ensuring Efficient Savings of Fuel, Energy and Material Resources".

Presented by UkSSR Ministry of Communal Housing.

32. PEREYASLAVTSEV Nikolay Aleksandrovich, SOKOLOV Anatoliy Pavlovich, SHENKAR' Azariy Salimovich, KOSOLAPOV Iosif Izrailevich, IVANOV Viktor Alekseyevich, ZHUDIN Nikolay Dmitriyevich, YARIN Vyacheslav Nikolayevich, TITKOV Mikhail

Ignat'yevich, KOZACHEK Valentin Mikhaylovich, SYTNIK Nikolay Ivanovich, "Creation, Investigation, Development, Automated Manufacture and Extensive Introduction in Energy Construction of New Reinforced Concrete Structural Members With External Reinforcement (Bar Structures)".

Presented by Kiev Department of Teploelektroproyekt All-Union State Planning Institute and Kiev Construction Engineering Institute.

33. KRASOVSKIY Vasiliy Anisimovich, SKURENKO Anatoliy Vlasovich, YEFIMOV Yuriy Yefimovich, OMEL'CHENKO Leonid Vasil'yevich, PETROV Viktor Mikhaylovich, NELIPA Vladimir Ivanovich, LOZHKIN Aleksandr Mikhaylovich, ZALOZNYI Vladimir Yakovlevich, BALAN Petr Kirillovich, OLENITSKIY Vladimir Anatol'yevich, "Complex of Mobile Television Stations for Serving the Twenty-Second Olympic Games and Providing Television Broadcasting in the Nation".

Presented by Special Design Office of Kirovograd Radio Parts Plant.

34. LYUBIMOV Viktor Georgiyevich, BAYANDIN Anatoliy Semenovich, VALYAVIN Ivan Grigor'yevich, GERGEL' Boris Yefimovich, GORDIYENKO Ivan Filippovich, YEGORSHIN Viktor Vasil'yevich, KELE-SHAGINOV Sergey Karpovich, KUTEPOV Sergey Stepanovich, SOLODOVNIKOV Konstantin Alekseyevich, SOKOLENKO Mikhail Dmitriyevich, "Creation and Industrial Introduction of a Set of Equipment for Producing Salted and Smoked Fish".

Presented by Central Design, Planning and Technological Office of the All-Union Fishing Association of the Azov-Black Sea Basin.

## II. TEXTBOOKS

1. RUDENKO Vladimir Semenovich, SEN'KO Vitaliy Ivanovich, CHIZHENKO Ivan Mironovich, "Principles of Conversion Technology", a textbook for institutions of higher education (second edition, "Vysshaya shkola", Moscow, 1980).

Presented by UkSSR Ministry of Higher and Intermediate Special Education.

2. RUBIN Simon Samoylovich, "General Agriculture", textbook for agricultural vocational schools (sixth edition, "Vysshaya shkola", Kiev, 1976).

Presented by UkSSR Ministry of Higher and Intermediate Special Education.

In publishing this list of works accepted for participation in competition for State prizes of the Ukrainian SSR in the area of science and technology for 1982, the committee appeals to scientific and scientific-technical societies, scientific institutions, enterprises, institutions of higher learning, scientists, specialists and the public at large to take part in discussing the works listed above, and to comment on their content and on the author collectives.

The titles of the works and makeup of author collectives have been published mainly in accordance with presentation, and will be more carefully defined in future discussion.

Responses and comments, and also materials of public discussion of the works and their author collectives should be sent to the committee by 1 October 1982 at: 252021, g. Kiyev-21, ul. Kirova, 18/2 kom. 3, Komitet po Gosudarstvennym premiyam Ukrainskoy SSR v oblasti nauki i tekhniki pri Sovete Ministrov USSR.

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CSO: 1814/20



## SOVIET-HUNGARIAN COOPERATION IN MICROELECTRONICS

Moscow PRAVDA in Russian 4 Oct 82 p 4

[Article by V. Gerasimov, Pravda correspondent: "With Expanding Integration"]

[Text] Budapest--Otto Mol'nar, director general of the Videoton Industrial Foreign Trade Joint Stock Company, worked for several years in Moscow. Our conversation was in Russian.

"Over the last ten years" he said, "we have increased export of computer technology by a factor of 43!"

The Soviet Union is the largest partner in Videoton. At the end of last year there were 450 computer systems with the trade name of this enterprise in operation at the service of Soviet Railroad workers, petroleum workers, geologists and power engineers, and in scientists' laboratories. There has been an increase in deliveries of peripheral equipment to the USSR--displays, terminals, line printers, information storage units, connecting modules. There has been an increase in the volume of equipment in the central technical service in Moscow.

"In 1980" the director general told me, "our business with the Soviet side amounted to 54 million rubles, this year it was 67 million, and next it will reach 83.7 million rubles. We are sending more and more equipment to East Germany, Czechoslovakia, Bulgaria, Poland and Yugoslavia."

In "electronic" cooperation of socialist nations, Videoton has been assigned a sector that might be called "Small and Minicomputers". These are the smallest in capacity of the YeS EVM computers, and minicomputers for controlling industrial processes, design or planning jobs, for office work and administrative purposes. The System Mini-52 computer has just been produced--the most powerful one in this division developed jointly by socialist nations. Three experimental models of the SM-52 have already been delivered to the Soviet Union.

Sharing his plans with me, the director general said: "We hope to be doing up to 120 million rubles worth of business with the USSR in 1985. To do this, there must be an expansion of integration. Electronics must be introduced into the national economy at an even faster pace, and into everyday living as well. Therefore it is very important for us not to simply increase the

business volume, but to organize extensive production interaction on new sections. There must also be an improvement in efficiency of machine utilization."

Production integration develops satisfactorily and rapidly if a start is made with joint developments. This thought was interjected into the conversation by Janos Gantner, director of Videoton Scientific Research Institute.

The institute affiliated with the Videoton plant numbers more than a thousand engineers, designers and programmers. In the director's office next to his desk is a blackboard and the flickering bluescreen of a display. A pencil is as good as ever for ideas, but it is faster to get data and technical information from the memory of a minicomputer.

And in this way, using old and modern means of visual "communication", Janos Gantner talks about cooperation. "Intellectual" integration started from the time when the institute was set up ten years ago. Today, combined studies are done by displays. These are adjusted for powerful Soviet computers, modules have been developed by which they can be made compatible with any computers. New extensive prospects have been opened up as well for production specialization and integration. Various units are being delivered from the USSR. Integration by subassemblies has also begun in production of line printers, where the foundations were laid in joint developments.

J. Gantner says that he feels "there are enormous reserves in development of integration. Strengthening of integration is being impeded by duplication of effort and bureaucracy. Each of us is also inadequately informed about work being done by the other. This year there have been a number of meetings and seminars with Soviet specialists. This helps us a lot."

In this connection, our Hungarian friends commented on the significance of the permanent exhibition of Soviet electronics that is opening in Budapest, the first of its kind in non-Soviet nations, organized by the Elektronorgtekhnika All-Union Foreign Trade Association (ELORG) in conjunction with the USSR Ministry of the Electronics Industry.

D. M. Saltykov, director of the technical center of ELORG in Hungary and of this permanent exhibition, gives examples of how new areas of mutual cooperation have been delineated as a result of the work of the exhibition. People come to the technical center not merely to learn about pocket calculators, but mainly for purposes of consultation, to become acquainted with the latest Soviet advances on a world-wide level. For example, Hungarian machine building plants have ordered numerical preset control devices for their machine tools in Japan. Now that they have become acquainted with the Soviet Elektronika NTs-31 numerical preset control unit with analogous characteristics, they are discussing a new contract with our representatives. Undoubtedly the exhibition will be conducive to increased shipments to Hungary and the conclusion of new contracts.

The Hungarian government has accepted a centralized program of development of electronics, production of microprocessors, various subassemblies and components. By 1990 the value of items produced should triple the current level. Exports to socialist nations are expected to double. Soviet items will meet 75 percent of the needs for various components in the electronics industry.

The sector is faced with the problems of maximizing utilization of the capabilities of cooperation within the CEMA framework, reducing dependence on imports from capitalist nations.

In Budapest in the spring, Mikroelektronika plant-institute began to fill the first lines of its biography. For the first time in Hungary, an institution has been established that covers the entire cycle: from research through introduction to series production of goods. Right now, equipment supplied by the Soviet Union is being installed in the shops. A franchise has been granted in the USSR for a type of technology used in producing integrated circuits.

It can be stated that CEMA agreements on setting up a unified standardized component base, on a microprocessor research program, on development of specialization and integration in production of microelectronics items, materials and technological equipment that have been signed in Sofia last year and in Budapest this year have found a specific agent in the person of Mikroelektronika.

Gabor Iklodi, director general of Elektromodul', has been a direct instigator and enthusiast in the introduction of the latest Soviet advances. This enterprise is helping to organize production in 21 plants of the republic. Here we find lively response to the achievements of CEMA nations and reserves of fraternal integration.

There is no argument about the success of CEMA nations in development of "electronic" cooperation. Before 1976, for example, joint developments had been undertaken by the Soviet Union and Hungary on six projects. The plan for this year includes 29 such projects. Since 1978, 23 automatic measurement complexes for a variety of integrated circuits and resistors have been conjointly developed. Eleven of these have already been turned over to Videoton and other electronics "bases" in Hungary, and have successfully undergone testing in the USSR.

Recently the Soviet-produced Elektronika-60 microcomputer fitted with Hungarian peripherals was presented to a court of specialists. The display was provided by the Videoton plant, and some other devices were furnished by the Hungarian Optics Combine. The unit was configured by scientists of the Central Physics Research Institute of the Hungarian Academy of Sciences.

In this way the new integration is forging ahead, the next module of fraternal interaction is being worked out.

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## LITHUANIAN STATE PRIZES AWARDED IN SCIENCE AND TECHNOLOGY

Vilnius SOVETSKAYA LITVA in Russian 22 Jul 82 p 2

[Excerpt] Yadviga Ignat'yeva, deputy to the main science secretary of the Presidium of the Lithuanian Academy of Sciences, and science secretary of the Committee on State Prizes of the Lithuanian SSR in the Area of Science and Technology, presents the winners of State prizes of the Lithuanian SSR and comments on their work.

The State prizes this year in the area of science and technology evidence the growing applied value of fundamental research, the increasingly stronger ties of science and practice, the weighty contribution of our researchers to continued flourishing of the national economy and culture. Many of these works are of significance not only for our republic, but also for the nation as a whole.

Of considerable value in a scientific and practical sense is the work of the director of the galvanotechnical laboratory of the Institute of Chemistry and Chemical Technology Doctor of Chemical Sciences S. Khotyanovich and Associate Member of the USSR Academy of Sciences, President of the Lithuanian SSR Academy of Sciences Doctor of Chemical Sciences Yu. Matulis, in the area of studying processes of electrodeposition of platinum, palladium and rhodium. Based on the theoretical principles presented by the authors and on the laws they were able to derive, valuable practical data were obtained enabling development and practical introduction into the industry of the nation of technological processes of electrodeposition of metals in the platinum group. The resultant ultrathin coatings reliably protect metals from corrosion in an aggressive medium and at high temperatures, and have unusually high stability. This kind of metal "armoring" has been introduced at the Tomilinsk Plant of Semiconductor Devices, Riga VEF Electrical Equipment Plant, Gorkiy Communications Equipment Plant, Kiyevpribor Production Association and other enterprises, and has resulted in a considerable savings of material and money.

Modern scientific-technical progress is closely related to advances in semiconductor electronics. A weighty contribution to development of the new field of semiconductor physics has been made by a series of papers by the director of the sector of inhomogeneous structures of the Institute of Physics of Semiconductors Doctor of Physical and Mathematical Sciences A. Ashmontas, Active



Member of the Lithuanian SSR Academy of Sciences and Vice President of the Lithuanian SSR Academy of Sciences Doctor of Physical and Mathematical Sciences Yu. Pozhela, and by the director of the laboratory of gradient phenomena of the Institute of Physics of Semiconductors Doctor of Physical and Mathematical Sciences K. Ryapshas. The scientists detected and studied a whole class of new effects associated with inhomogeneous heating of charge carriers by a strong electric field. Based on the investigation of these effects, a number of semiconductor devices have been created that are of considerable significance for science, engineering and production. This work has stimulated broad interest, and the papers have been published in Soviet and international science journals.

Of significance to practically all sectors of the national economy is a series of papers "Ensuring Electromagnetic Compatibility of Computers" by a group of specialists of the special design office of computers of Sigma Production Association under the leadership of Candidate of Technical Sciences I. Gurvich, managing designer of the department of circuitry and power supply sources of this office. This small collective theoretically analyzed mechanisms of the action of various external interference factors on computers, worked out an original simulator for measuring interference immunity of computers, and prepared a set of normative documents for Soviet instrument making, and for enterprises on producing means of automation and control systems. Ten works have been granted invention patents; they are being used to produce more reliable computers in the Soviet Union and nations of socialist cooperation. The recommendations made by these Vilnius citizens have improved interference immunity of computers by a factor of about ten, appreciably reduced losses arising as a consequence of equipment failure and rejected production output. In Sigma Association alone this amounts to a savings of 1.3 million rubles yearly.

Up to 420,000 rubles will be saved for the national economy of the nation for each machine produced by the Kapsukskiy Automatic Food Equipment Plant imeni the Fiftieth Anniversary of the USSR. Scientists of Kaunas Polytechnical Institute imeni Antanas Sneckus in cooperation with specialists of the enterprise have developed a real automatic packaging "conveyer" by using original design features and new materials. Thanks to the new method of packaging goods it has been possible to transfer thousands of workers to other jobs in enterprises of the food industry. This series of papers has been awarded a State prize, and will be conducive in large measure to realization of the Food Program: automated packaging will improve continued supply of goods to the consumer, prolong the storage period, eliminate losses of agricultural produce.

Directly involved with realization of the Food Program as well is another work: a monograph "Black-Variegated Cattle of Lithuania" by Candidate of Agricultural Sciences Y. Kuosy, manager of the department of agricultural animal breeding of the Lithuanian Veterinary Academy. The scientist has done a great deal to improve the productivity of cows and to further breeding of pedigreed livestock in the republic. This monograph, which generalizes the most valuable experience on creating and improving cows of the black-variegated Lithuanian breed, is a handy helper to every livestock breeder and animal expert in the cause of getting high production results on collective and state farms.

The Marine Museum and Aquarium in Klaypeda has become a true focus of culture of the republic, a center of education and dissemination of historical and natural sciences. The facility is distinguished by striking artistic treatment, and by original architectural, engineering and scientific features. Work that has continued for more than ten years on restoration of the Klaypeda Fortress destroyed by the Nazis and adaptation to its new functions is being done by a large group of architects, engineers, builders and other specialists.

Over the last ten years there has been an extensive program of road modernization in the republic. The builders of engineering structures--bridges and viaducts--have achieved especially good results. Specialists of Lithuanian State Institute on Research and Design of Highways in conjunction with practical workers, using the latest advances of scientific and technical progress, have introduced more progressive and economic structural components into the planning and construction of bridges and viaducts. A considerable effect has been produced by steel and concrete structures using low-alloy steel: this has saved about 50% on metal. Coming into wider and wider use is connection of structural components by special bolts, cementing of reinforced concrete components, and a new antifriction material--naftlen. All this has helped in the building of engineering-road structures that are up to world standards on economy, traffic safety and esthetics.

State prizes have also been awarded for two textbooks. Candidate of Pedagogical Sciences B. Bal'chitis, professor of the department of primary education of Shyaulay Pedagogical Institute imeni K. Preykshas has been awarded a prize for the textbook "Mathematics" for first, second and third classes. Based on the present-day theory of pedagogy and dialectics, the author has created a system of beginning mathematics instruction that improves the handling of problems of instructing, indoctrinating and educating children in accordance with the program. A high topical and procedural level distinguishes the textbook "Reinforced Concrete Structures" prepared by a group of scientists of Vilnius Engineering Construction Institute. Its originality is a result of new methods of teaching the theory of reinforced concrete, recommendations on optimizing structural components and automating design.

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## USSR FOOD PROGRAM DISCUSSED AT GENERAL MEETING OF ESTONIAN ACADEMY OF SCIENCES

Tallinn SOVETSKAYA ESTONIYA in Russian 7 Oct 82 p 3

[Text] The May 1982 Plenary Session of the CPSU Central Committee and the Food Program approved for the period up to 1990 have become important historical landmarks in the planning and direction of the national economy. The successful execution and early resolution of problems formulated in the program are the business of the entire nation. The Food Program also poses important problems for science.

Eminent scientists of Estonia, the directors of ministries and agencies assembled on 6 October in Tallinn in the building of the Presidium of the ESSR Academy of Sciences to discuss problems on execution of the Food Program.

The meeting was opened by the president of the ESSR Academy of Sciences, K. Rebane.

The main report was presented by E. Parmasto, associate member of the ESSR Academy of Sciences. From one year to the next there is an increase in the volume of research work being done in agriculture, he noted, as well as the range of topics receiving attention from scientists of the ESSR Academy of Sciences.

About a tenth of the workers in institutes of the Academy are working on agricultural projects. In 1981 on the basis of 27 topics research was done aimed at development of agricultural production. These were all a component part of Soviet-wide or republic-wide comprehensive programs.

One of the major problems facing scientists is to increase the total volume of grain production to 1.6 million metric tons during the Twelfth Five-Year Plan. Within the framework of the All-Union scientific research work, the collective of the Academy is singling out varieties of wheat that are resistant to diseases, pests, and give a good yield even under unfavorable conditions.

The potential yield of such varieties should be at least 80-90 centners per hectare [ $3\frac{1}{2}$ -4 tons per acre]. Comrade E. Parmasto stated further that a major task of the ESSR Academy of Sciences is in-depth physical research, the solution of fundamental problems of science. Scientists should be guided in their work by the words of Comrade L. I. Brezhnev spoken at the celebration of the

250-th anniversary of the USSR Academy of Sciences to the effect that there is nothing more useful to practice than a good in-depth theory.

On this basis, some results of scientific research have been checked out directly on the farms. For example at the Ranna State Farm, on the basis of theoretical developments of the Institute of Experimental Biology, 80 grams of protein feed less than previously stipulated is being used to produce 1 kg of broiler meat in accordance with recommendations on changing the feeding system.

A general direction in work of the Academy is carefully arranged cooperation between academic and sectoral agricultural institutes. Such cooperation between the Institute of Experimental Biology and the Estonian Scientific Research Institute of Cultivation and Land Reclamation is bringing success in isolating new varieties of cereal crops. Such cooperation is also developing between other academic and sectoral institutes.

An important problem that scientists of the ESSR Academy of Sciences can help to solve on a republic and Soviet-wide scale is development of dairy and meat-producing animals with an aim to efficient use of land. Scientists of Estonia have already done a detailed analysis on the state of the land reserves in the republic, and also in the Non-Black Earth Zone. Some suggestions have been made for more rational use of this land, and on growing high-yield grasses for feed. The result of this should be an increase in the production of animal products and better utilization of the potential productivity of cattle. The resolutions of the May 1982 Plenary Session of the CPSU Central Committee enable realization of these recommendations on state and collective farms.

Considerable work on improving the use of natural meadows and determining the feasibility of converting some of them to cultivated pastures has been done by the Institute of Zoology and Botany of the ESSR Academy of Sciences in cooperation with Estel'khozproyekt State Planning Institute.

At the Seventh Plenary Session of the Central Committee of the Communist Party of Estonia, K. Vayno, first secretary of the Central Committee of the Communist Party of Estonia, spoke about the necessity of developing and implementing a republic-wide "Feed Protein" target program. To solve this problem, scientists of the Scientific Research Institute of Cultivation and Land Reclamation in conjunction with the Estonian Agricultural Academy made some valuable proposals. Research must be done on a broad front, and the initiative of state and collective farms must be encouraged, a matter which frequently does not get the necessary economic analysis.

In the area of selecting and singling out new and productive varieties of potatoes, important work is being done by the Institute of Biology and Botany in conjunction with the Yygeva Selection Station.

Industry and science of Estonia are making a great contribution to production of mineral fertilizers. This work is of Soviet-wide importance. The Institute of Geology of the ESSR Academy of Sciences has prepared a forecast map of prospective reserves of phosphate rocks. Scientists are working on a program for



comprehensive use of phosphate rock deposits with consideration of the requirements of environmental protection. Some suggestions have been made to the ESSR Ministry of Agriculture on efficient use of phosphorus fertilizers and the concomitant preservation of the ecological balance.

The Institute of Thermophysics and Electrophysics has made recommendations to republic-wide planning agencies and the ESSR Ministry of Agriculture on efficient energy provision to agricultural areas.

The Institute of Cybernetics is doing successful research on developing a system for regulating temperature and humidity in shaft grain driers. An experimental system has been produced, and a patent has been applied for.

Scientists in economics have solved a wide range of socioeconomic problems within the framework of the republic-wide comprehensive program on development of agroindustrial complexes.

In conclusion, the speaker noted that implementation of the Food Program has become an important cause for the collective of the Academy. Scientists are doing whatever they can to make the Program a success.

Discussions on the main report were led by ESSR Minister of Agriculture V. Lind. He stated that it is certainly important for fundamental academic sciences to participate in realization of the Food Program. For several years now the scientists of the Academy have been giving the agriculturalists of the republic very useful advice. Well organized cooperation between the Academy and sectoral institutes as well as plant selection workers will enable fulfillment of the main task of providing the populace of the nation with high-quality agricultural produce in large volume.

Also taking part in the discussions were the directors of scientific research institutes, Party and farm workers of the republic.

The appropriate resolution was passed.

An award ceremony was held for workers of the ESSR Academy of Sciences.

Taking part in the work of the general meeting of the ESSR Academy of Sciences were Secretary of the Central Committee of the Communist Party of Estonia R. Ristlaan, ESSR Minister of Higher and Intermediate Special Education I. Nuut and ESSR Minister of Fruit and Vegetable Growing Kh. Myannik.

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## SOVIET FOOD PROGRAM DISCUSSED AT MEETING OF SCIENTISTS

Moscow SOVETSKAYA ROSSIYA in Russian 23 Sep 82 p 2

[Session of general meeting of USSR Academy of Sciences and All-Union Academy of Agricultural Sciences]

[Text] A major condition for successful realization of the USSR food program is accelerated introduction of the advances of fundamental and applied science into agricultural practice. The problems of science in this nation-wide job are being discussed at a joint session of the general meeting of the USSR Academy of Sciences and the All-Union Academy of Agricultural Sciences imeni V. I. Lenin that opened on 22 September in Moscow.

In the presidium of the meeting is a member of the Politburo of the CPSU Central Committee, Secretary of the CPSU Central Committee M. S. Gorbachev, Secretary of the CPSU Central Committee M. V. Zamyatin, deputy chairmen of USSR Council of Ministers N. K. Baybakov, I. I. Bodyul, G. I. Marchuk, department managers of the CPSU Central Committee V. A. Karlov and S. P. Trapeznikov, eminent Soviet scientists, directors of ministries and agencies.

Academician A. P. Aleksandrov, president of the USSR Academy of Sciences, gave the opening speech to those assembled. He spoke about the major areas of scientific support of this nation-wide cause to which all Soviet scientists are sincerely devoted. Large research centers of all the Union republics are connected with fulfillment of the high mission of science. Comprehensive solution of both national economic and regional problems is supported by such a broad research front. The president emphasized that an important aspect of the activity of the Academy of Sciences should be emergence of the introduction of advances in physics, chemistry and biology into agrobusiness on a qualitatively new level. This is especially important in such sections of the food program as improving systems of cultivation, creating new strains, selecting highly productive breeds of cattle, improving the reliability of agricultural equipment, developing effective methods of controlling diseases of plants and animals.

Never before has our nation had such impressive scientific and technical might. Academician Yu. A. Ovchinnikov, vice president of the USSR Academy of Sciences, pointed out in his survey report that this applies as well to that part of the scientific forces of the nation where research is aimed directly at improvement of the agrarian-industrial complex. The scientist noted that development and implementation of the USSR food program will pass into the history of the

Soviet State as one of the greatest accomplishments of our Party and of the entire Soviet nation. This document is a demonstration to the whole world of the life-asserting force in the principles that are the basis of our system, the great courage and humanism of Leninist teachings. Under conditions where imperialism and colonialism, kindling conflicts and wars, are trying to turn history backwards, the Soviet Union is ponderously and mightily continuing its consistent course of creation and peace, demonstrating good will toward cooperation with other nations, unswervingly striving to make a constructive contribution to resolution of such global problems as food, energy, protection and rational use of the environment, human health, culture and well being.

In a cause of such importance to the nation as realization of the food program, a decisive factor is the self-sacrificing labor of all workers in the area of the food complex, self-discipline, zeal, economy in all units. However, stressed the scientist, we must not fail to recognize that the specific nature and scale of this work on the current stage necessitate re-examination of ideas formulated long ago, development of new and progressive technologies, use of more effective economic levers, improvement of planning and management, and this cannot be achieved without considering all capabilities that are offered at present by scientific and technical progress. The latest ideas and greatest discoveries in physics, chemistry, biology, earth science, space science must be put as soon as possible at the service of the great cause of raising the standard of living of the nation.

Academician Yu. A. Ovchinnikov analyzed the greatest developments of scientists of the USSR Academy of Sciences, the academies of the Soviet Republics, and the All-Union Academy of Agricultural Sciences imeni V. I. Lenin. Genetics has laid the strongest foundation for high yields in the complex of the biological sciences. Joint developments by the Institute of Chemical Physics of the USSR Academy of Sciences with plant selection institutions by the method of chemical mutagenesis have yielded more than a hundred new strains of wheat, rice, oats, maize, sunflowers and other crops. This method is capable of producing fundamentally new high-yield, stable, high-quality varieties. For example, the "pervenets" sunflower mutant synthesizes oleic acid instead of linoleic, enabling production of oil that is similar to olive oil in its properties. Genetics also now offers valuable experience for intense development of animal breeding and production of high-yield feeds.

A qualitatively new phase in resolution of the problems of the food program has been opened up in connection with the development and introduction of methods of genetic engineering and bioengineering.

Speaking at length on problems of soil science, the scientist stated that this research front requires strengthening of the union of researchers and practitioners. Especially considering the fact that more than half of the agricultural lands of our nation are situated in unfavorable climatic conditions. Considerable reserves in improvement of the use of land resources are revealed by remote aerospace methods of checking the state of soils and new crops, introduction of new forms of fertilizers, efficient means of protecting plants and animals from diseases, development of industrial methods of processing and storing agricultural goods; extensive introduction of new machines and mechanisms in all areas of the agrobusiness complex.

P. P. Vavilov, associate member of the USSR Academy of Sciences and president of the All-Union Academy of Agricultural Sciences, dealt in his report with the problems of agricultural science in realization of the resolutions of the May 1982 Plenum of the CPSU Central Committee. He said that over the last three five-year plans the Academy of Agricultural Sciences has been transformed into an extensively branching center of agrarian science with the creation of regional departments of the Academy and a considerable increase in the number of scientific institutions. The Agricultural Academy now unifies more than 120 scientific research institutes and about 200 other science institutions. Fifty plant breeding selection centers are in operation in different soil and climate zones of the nation. During the Tenth Five-Year Plan, 723 new varieties have been regionalized, including 528 field crops, which is nearly a 30% increase over the Ninth Five-Year Plan. These varieties are being successfully introduced into production.

Noting that implementation of the food program requires the efforts of scientists of many specialties, the speaker gave a detailed characterization of the problems that remain today before economic science, cultivation, plant breeding, animal husbandry, genetics, selection, seed growing, and livestock breeding, and stressed the importance of activizing research in many other areas. This means not only the selection of guidelines for further development of agricultural studies. Another aspect of the cause that is just as important is improvement of methods and means of putting the results of scientific research into production. We have already accumulated considerable experience in introduction, and a number of scientific production associations have been set up that have made a good showing; however, all work on introduction requires radical improvement, and should be formulated as a target program.

The joint session of the two academies is continuing its work.

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## SILVER ANNIVERSARY OF SCIENCE INSTITUTE

Novosibirsk AVTOMETRIYA in Russian No 3, May-Jun 82 pp 2-3

[Editorial board statement on the 25th Anniversary of the Institute of Automation and Electrometry of the Siberian Branch of the USSR Academy of Sciences]

[Text] This year our country is observing the fortieth anniversary of the Siberian Branch of the USSR Academy of Sciences. For colleagues of the Institute of Automation and Electrometry, within the Branch, this anniversary is doubly noteworthy.

Initial activities of the Institute of Automation and Electrometry (1957-1967, under the directorship of member-correspondent, USSR Academy of Sciences, K. B. Karandeyev) were done with the aim of creating and refining methods and instruments for electrical measurements. High-quality measuring instruments, automatic control devices, a series of unique electronic measuring systems and components, and various devices for surface and aerial electronic surveying for mineral resources were developed. Many of these devices and systems were perfected and produced in series for industry. The products of the institute's operations in electrometry that were introduced by the Tochelektropribor plant in Kiyev were awarded a State Prize in 1976. The principal contribution of the Institute of Automation and Electrometry to geophysical instrument making was cited by Siberian geophysicists during their advancement of the enormous collective work associated with the competition for a State Prize in 1977.

Since 1967, the institute has been headed by Academician Yu. Ye. Nesterikhin. The basic direction of the work of the institute during this stage has included the study of nonlinear phenomena of various physical properties, optical data processing, and the development of new automation methods and equipment.

Characteristic of the tasks that are solved by the institute are technology transfer at the cutting edge of science and the complex application of the latest achievements from various scientific fields (microelectronics, precision mechanics, laser physics, computer technology, and so on). These tasks have called for new organizational forms for carrying out the work and assimilating the results. For example, a special design bureau for scientific instruments was formed using resources of the design division of the institute. The special design bureau is responsible for test and design work for implementation in the Institute for

Scientific Research Work. The special design bureau for scientific instrument making rapidly solved the problem of supplying institutes of the Siberian Branch with an apparatus of the KAMAK standard, manufactured by the pilot production plant of the Branch in accordance with documentation from the special design bureau. A significant contribution to the assimilation of the institute's designs has been made by the intersectorial design divisions that connect the institute with the enterprises of two ministries.

The institute's progress in the automation of scientific research is well known. Specifically, the initial domestic development and application of the KAMAK system took place in the Institute of Automation and Electrometry. Also of note are the manufacture of model problem-oriented automated systems using microprocessors and KAMAK equipment, the pioneer work in using KAMAK in scientific instrument making, the development and implementation of methods for complex computers using KAMAK principles. The institute's accomplishments in this area are being used extensively in the USSR Academy of Sciences and within industry. Examples of effective assimilation (in cooperation with industrial enterprises) include the RATAN-600 radiotelescope control systems, the Magistral' complex of automatic scientific studies and planning, and an archival memory holographic system. The operation of the initial stage of the center for data processing is a remarkable success of the institute. The center is supplied with the latest products of the Institute of Automation and Electrometry.

Other classified special innovations besides this short summary of results of government-wide significance include laser periphery, precision programmed photogrammetrical systems, devices for the input and output of images, measuring devices for distance and shift, and so on. Use of these new devices qualitatively changes the appearance and potential of automated systems for the collection and processing of information.

Automation has changed physical experiments. One example is a laser gravimeter that was developed in the institute. In terms of the precise measurement of gravitational acceleration it is unequalled within the Soviet Union. Since it is transportable it is fully competitive with stationary foreign made instruments. This was demonstrated during combined testing of Soviet, French, and American instruments in Paris in 1981.

A second example is an experimental study of laminar flow transition from liquid to turbulent stages. The complex approach of developing mathematical models and using laser doppler measurements of liquid velocity, the KAMAK system, a control computer, and equipment for real-time representation of data permitted the tracking of the development of random motion of the fluid and the dynamics of the development of turbulence.

The successful accomplishment of applied innovations would have been impossible without the advanced development of fundamental investigations. Impressive successes were achieved in the study of memory in solids, the discovery of photoinduction drift of atoms and molecules, and the determination of the feasibility of modifying biomolecules using laser methods.

The head of the American delegation to the Second Soviet-American Seminar on Optical Data Processing in Novosibirsk in 1976, George Strouk, after visiting with his eminent colleagues at the institute's laboratory, wrote in his official memorandum: "As specialists in such fields as optical and digital image processing, electronics, and automatic control, we are able to state that the level of work in the institute is exceptionally high, while the experimental equipment and resources cannot be equalled in a single other academic institute anywhere in the world."

The collective of the institute over the quarter century of its existence has made an enormous contribution to science and to the national economy. Its staff has been awarded about 550 author's certificates for inventions, 10 patents, and certificates for discoveries; more than 2,000 articles have been published in domestic and foreign publications; and 60 monographs have been published. The institute has received 9 diplomas from the Exhibition of the Achievements of the Economy, comprising 1 honorary degree (in 1979), 4 diplomas of the first rank and 4 of the second rank. Personnel of the institute have been awarded 64 medals by the USSR Exhibition of the Achievements of the Economy, as well as tens of certificates as participants at the exhibition. In appreciation of their scientific and technical achievements, 24 members of the institute have been honored with the highest governmental awards.

The achievements of the institute in recent years are equivalent to a guarantee of its successful participation in the future development of science and the national economy.

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